750

CVC MCQs

Austin
AR

1. In a patient with aortic regurgitation, there is also a mid diastolic murmur at the apex, cause of this murmur is?

   A. Graham steel murmur
   B. Austin Flint murmur ✓
   C. Carey coombs murmur
   D. Mitral regurgitation
   E. Innocent murmur

RA.
Carey coombs
Or.
ARF

Ans: Austin Flint murmur

Explanation: Austin Flint murmur heard in severe AR is due to diastolic displacement of anterior leaflet of mitral valve by AR stream. It is a mid diastolic murmur heard at the apex. Graham Steel murmur is early diastolic murmur of PR results from dilation of pulmonary valve ring in mitral valve disease with severe pulmonary hypertension. Carey Coombs murmur is mid diastolic murmur in RF due to mitral valvulitis.

MR causes pansystolic murmur. Innocent murmurs are mostly ejection systolic.

2. The most common physical sign of mitral stenosis is?

   A. Displaced apex beat
   B. Accentuated S2
   C. Irregular pulse
   D. Mid diastolic murmur ✓
   E. Opening snap

Austin flint murmur

Aortic
Au
AR

Ans: Mid diastolic murmur

Explanation: Mid diastolic murmur and loud first heart sound are the pathagnomic signs of MS and are the common findings. Apex beat is not displaced in MS rather it is tapping. Accentuated S2 occurs in pulmonary hypertension due to severe MS. Irregular pulse is present in 30 % patients with MS, and opening snap is not heard in severe MS.

PDA

3. Reversal of shunt in patent ductus arteriosus causes:

   A. Cyanosis in upper limbs
   B. Clubbing in upper limbs
   C. Cyanosis in lower limbs
   D. Coronary steel syndrome

E. Systemic hypertension

Ans: Cyanosis in lower limbs

Explanation: With reversal of flow in PDA, unoxygenated blood is shunted to the descending aorta after the origin of subclavian arteries, so cyanosis and clubbing occur in lower limbs, a condition called differential cyanosis. Coronary steel syndrome occurs in severe aortic root to right heart shunts and systemic hypertension occurs in coarctation of aorta.

4. A 64 old year old female presented with 3 months history of increasing ankle edema and abdominal distention. There was no history of cough, exertional dyspnea or orthopnea. On examination, she had pitting edema up to mid thighs. JVP was elevated up to ear lobes which increases on inspiration with absent y descent. There was no murmur. ECG showed low voltage QRS complexes. Echo showed biatrial enlargement. What is the diagnosis?

   A. Dilated cardiomyopathy
   B. Constrictive pericarditis
   C. Hypertrophic cardiomyopathy
   D. Restrictive cardiomyopathy ✓
   E. Tricuspid regurgitation

CA [illegible]

Left

56,000 -80,000

compan

Ans: Restrictive cardiomyopathy

Explanation: Signs and symptoms of right sided heart failure with biatrial enlargement and low voltage ECG with elevated JVP and absent Y descent on JVP are characteristics of restrictive cardiomyopathy. In constructive pericarditis, there is steep y descent. In dilated cardiomyopathy, there are signs and symptoms of left sided failure as well. Hypertrophic cardiomyopathy presents in early age and presents with sudden cardiac death. In tricuspid regurgitation, there is pansystolic murmur.

5. A 29 year old female presented with one week H/O increasing dyspnea, orthopnea and PND. She had undergone a C-section two weeks previously. This was her 1st pregnancy. During pregnancy, she had a completely normal echocardiography which was done for a short systolic murmur. O/E she has tachycardia, S3 heart sound, bilateral fine crackles up to midzones with raised JVP and bilateral ankle edema. No murmur appreciated. What is the diagnosis?

   A. Idiopathic dilated cardiomyopathy

B. Infective endocarditis

C. Takotsubo cardiomyopathy

D. Viral myocarditis

E. Peri-partum cardiomyopathy ✓

Ans: Peri-partum cardiomyopathy

Explanation: Peri partum cardiomyopathy develops during the last trimester or within the first 6 months after pregnancy. Heart failure after pregnancy is most likely due to PPCM. No history of fever or murmur rules out IE and myocarditis. Idiopathic dilated cardiomyopathy is the diagnosis of exclusion when all other known factors have been excluded. Takotsubo cardiomyopathy typically occurs in older women after sudden intense emotional or physical stress and presents as chest pain with acute pulmonary edema with ECG changes mimicking acute infarction.

6. A patient with crushing central chest pain for 4 hours came to emergency. ECG done showed T wave inversions in all precordial leads. What should be the next investigation?

MUGA

CT

A. CKMB

B. Trop-T

C. LDH

D. Myoglobin

E. AST

CT-brain

60-90 Co.

30-60 MRA

<30. CT

Ans: Troponin-T

Heparin

Explanation: ACC/AHA recommends that cardiac biomarkers should be measured at presentation in patients with suspected MI and only biomarker that is recommended to be used is cardiac troponin due to its superior sensitivity and accuracy. CKMB used in re infarction. Other tests are non specific.

7. Which one of the following is not a cause of T wave inversion in ECG?

A. Sub arachnoid hemorrhage

B. Myocardial ischemia

C. Pulmonary embolism

D. Hyperglycemia

E. Bundle branch block

FCP

Ans: Hyperglycemia

Explanation: Hyperglycemia is commonly associated with hyperkalemia initially with changes of hyperkalemia on ECG. Hyperkalemia causes tall T waves. SAH produces widespread deep T wave inversions with a bizarre morphology due to raised ICP. Myocardial ischemia causes dynamic T wave changes, pulmonary embolism, causing acute right heart strain, causes t wave inversion in right precordial and inferior leads. BBB causes T wave changes discordant to the main QRS axis.

8. A 50 year old patient with complaints of exertional SOB, bilateral pedal edema and recurrent palpitations came to OPD. ECG showed sinus rhythm and patient is hemodynamically stable. What is the best long term treatment option for him?
   - KP A. Furosemide
   - B. Furosemide+ Ramipril
   - C. Furosemide+ Ramipril+ bisoprolol ✓
   - D. Furosemide+ digoxin
   - E. Furosemide+ nifedipine

220/120

80mg 180

Ans: Furosemide+ ramipril+ bisoprolol

Explanation: ACE inhibitors and beta blockers are mortality reducing agents in heart failures. All patients with current or prior symptoms of heart failure should be on ACE inhibitors and beta blockers along with diuretics for fluid retention. Nifedipine is contraindicated in HF. Digoxin is indicated in HF with atrial fibrillation.

9. A young boy has to squats while playing. He has a history of a drop attack 1 year back. Examination revealed ejection systolic murmur which becomes softer with squatting. What is the diagnosis?
   - A. Aortic stenosis
   - B. Patent ductus arteriosus
   - C. Coarctation of aorta
   - D. Hypertrophic cardiomyopathy ✓
   - E. Mitral valve prolapse

Ans: Hypertrophic cardiomyopathy

Explanation: The murmur of HOCM becomes soft with rapid squatting as venous return to the heart increased and outflow tract obstruction becomes less severe. In contrast, aortic stenosis murmur increased in intensity with squatting as more blood is being ejected from aortic valve. PDA causes machinery like murmur while COA causes hypertension. In mitral valve prolapse, there is mid systolic murmur.

Aug AR.

Dynamic manoeuvres and systolic murmurs:

Manoeuvre	HOCM	MVP	AS	MR
Valsalva strain phase	Louder	Longer	Softer	Softer
Squatting or leg raise	Softer	Shorter	Louder	Louder
Hand grip	Softer	Shorter	Softer	Louder

10. A 54 year old male collapsed suddenly in emergency. He became pulseless. ECG showed ventricular tachycardia. What would be your next step?
    - A. Adrenaline
    - B. Atropine
    - C. Amiodarone
    - D. Defibrillation
    - E. Vasopressin

B.

ICD.

25

VIII

XII

VT

XII

RF

Caney

Ans: Defibrillation

Explanation: The two indications of defibrillation are ventricular fibrillation and pulseless VT. As this patient is in pulseless VT, defibrillation is indicated.

11. A 25 year old man who is a known cocaine addict presented with central crushing chest pain of 3 hours duration after using cocaine 4 hours back. An ECG revealed ST segment elevation in V1, V2 and V3. His BP is 180/110 with a pulse of 132 per minute. What is the next best step of management?
    - A. PCI ✓
    - B. Aspirin and heparin
    - C. IV metoprolol
    - D. Thrombolysis

E. Diazepam

Ans: Diazepam

Explanation:

- Cocaine induced STEMI should be treated with PCI if available as cocaine causes vasospasm with platelets activation and acute arterial blockage.
- If PCI is not available, then thrombolysis should be done, but thrombolysis should be used with caution as there is also a risk of aortic dissection in cocaine abuse.
- Beta blockers should be avoided because cocaine causes vasospasm and beta blockers worsen this.
- Aspirin, nitrates and heparin are used if there is no ST elevation but patient has chest pain and ECG changes other than STEMI.
- Diazepam is used with no cardiac complications. Seizure.
- Nitrates are used with isolated high blood pressure with no ECG changes.

12. A patient is on warfarin therapy for atrial fibrillation with INR of 2.2 needs endoscopy for a suspicion of Celiac disease. What should be done for warfarin?

    A. Stop warfarin

    B. Replace with aspirin

    C. Bridge with heparin

    D. Continue with same dose

    E. Skip one dose

35

2.5

60

5

2 → 3,

poly bx

bx 23

Ans: Continue with same dose

Explanation:

- In low risk endoscopic procedures, like EGD and colonoscopy with or without biopsy, and ERCP with stent exchange, warfarin should be continued with same dosage provided that INR is within therapeutic range.
- In high risk procedures, like EGD or colonoscopy with dilation, polypectomy or thermal ablation and PEG tube insertion, warfarin should be discontinued 3 to 7 days before procedure with INR less than 1.5 for procedure. Heparin bridging therapy is used for that.

3-4
4-4.5 (6)

13. A 21 year old boy with 2 months history of fever has a pansystolic murmur at mitral area. Transthoracic ECHO showed mitral regurgitation with no other findings. What other investigation should be done next?

    A. Chest X-RAY
    B. Angiography
    C. Trans esophageal ECHO
    D. Thallium scan
    E. Cardiac catheterization

[illegible]

OGD? | Ce

bio

(5)

Ans: Trans esophageal ECHO

TEO — 7. 6 months

Explanation: Transthoracic ECHO cannot image vegetation less than 2 mm in diameter and detects vegetations in 60 to 80 percent, if the clinical suspicion of IE is high then TEE should be done as it detects vegetations in more than 90% of patients with definite IE. Any patient with a history of fever and murmur or new onset valvular regurgitation should be evaluated for IE. Angiography and thallium scans are used for ischemic heart disease.

14. A patient presented with complaints of palpitations and apprehension in emergency. ECG showed ventricular tachycardia at a rate of 190/ min with a blood pressure of 85/60 mmhg and a palpable pulse. What should be the next best management step?

    A. Defibrillation
    B. Cardio version
    C. Metoprolol
    D. Amiodarone
    E. Lignocaine

lupus

XII

3.
3-4. 1
4-4.5 (6.)
>4.5
(9) MgSO4

Ans: Cardio version

phenytoin

Explanation: This is a case of unstable VT with pulse for which the treatment of choice is cardioversion.

- Pulseless VT=> **Defibrillation**
- Unstable VT with pulse=> **cardioversion**
- Stable VT with pulse=> **amiodarone**

Phenytoin (9)

15. A patient presented with bilateral pedal edema is on many medications for resistant hypertension. CXR, ECHO and urinalysis results are normal. Which drug can cause this problem?

    A. Atenolol

B. Valsartan

C. Amlodipine

D. Prazosin

E. Spironolactone

Ans: Amlodipine

Explanation: Peripheral edema is considered to be a common and annoying adverse effect of calcium channel blockers. It occurs secondary to arteriolar dilatation causing intracapillary hypertension and fluid extravasation. Treatment is change to other hypertensive medications. Diuretics do not relieve the edema caused by CCBs.

16. A 45 year old patient presented with sudden onset of chest pain. Angiography was done which showed 85% stenosis of proximal LAD. What is the best treatment option for this patient?

    A. Medical therapy

    B. Non drug eluting stent

    C. Drug eluting stent ✓

    D. Heparin therapy

    E. CABG

③ 70 65

Drug

12. 12

Ans: Drug eluting stent

Explanation: Drug eluting stent locally delivers antiproliferative drugs and reduce restenosis. Bare metal stents causes recurrent stenosis within 6 months. CABG is mainly used in left main stem disease or triple vessel disease.

17. A patient presented with resistant hypertension has radio radial and radio femoral delay on examination. What is the most probable lesion?

    A. Coarctation of aorta before origin of subclavian artery

    B. Renal artery stenosis

    C. Coarctation of aorta after origin of subclavian artery

    D. Patent ductus arteriosus

    E. Pheochromocytoma

Ans: Coarctation of aorta before origin of subclavian artery

Explanation:

- Radio femoral delay => **COA after subclavian artery origin**
- Radio radial and radio femoral delay=> **before subclavian artery origin**

PDA presents with differential cyanosis, renal artery stenosis causes renal bruit. Pheochromocytoma presents with paroxysm of hypertension.

18. A large V wave in JVP occurs in:

    A. Mitral regurgitation

    B. Tricuspid regurgitation ✓

    C. Mitral stenosis

    D. Atrial fibrillation

    E. Complete heart block

18cc Comp VI

184 Compuls Complns

Ans: Tricuspid regurgitation

Explanation: The V wave represents atrial filling during atrial diastole and occurs during ventricular systole. The height of the V wave is determined by right atrial compliance as well as the volume of blood flow to the right atrium. In patients with TR, the V wave is accentuated and v wave merges with the c wave. Atrial fibrillation causes absent a wave and complete heart block causes irregular cannon a waves.

19. Which one of the following is the imaging modality of choice for diagnosis and monitoring of cardiomyopathies?

    Ischemia

    A. Thallium scan ✓

    B. Angiography ✓

    C. Cardiac catheterization

    D. Echocardiography ✓

    E. Chest X-RAY

Ans: Echocardiography

Explanation: Echocardiography is the imaging modality of choice for diagnosis and monitoring of all types of cardiomyopathies. Thallium scan and angiography are used in the work up of ischemia. Cardiac catheterization is used in the assessment of anatomy and physiology of the heart and to evaluate the extent and severity of the cardiac disease.

20. Which one of the following murmur will increase in length and intensity with Valsalva maneuver?

A. ESM of HOCM

B. PSM of MR

C. MDM of MS

D. ESM of AS

E. EDM of AR

SAF

Ans: ESM of HOCM

Explanation: Valsalva maneuver causes decrease in LV preload with increase outflow obstruction, so ESM of HOCM is intensified in strain phase of Valsalva maneuver whereas ESM of AS becomes soft during Valsalva maneuver as less blood flows through the stenosed valve. PSM of MR also gets softer with Valsalva maneuver.

ABCDE

21. Aortic stenosis is associated with which of the following condition? = VW

AR

A. Marfan syndrome

B. Turner syndrome

C. Klinfilter Syndrome

D. Heyde syndrome

E. Eisenmenger syndrome

BCT

VNRT

OLTHO

Anterior

OUTH

Ans: Heyde syndrome

Explanation: Heyde syndrome is a triad of aortic stenosis, coagulopathy and GI bleeding due to angiodysplasia. Currently, the most accepted mechanism is increased shear stress forces, particularly across a stenotic aortic valve, induce conformational changes in large VWF multimers that result in the exposure of the A2 domain. Exposure of this domain allows the enzyme ADAMSTS13 to cleave large VWF multimers into smaller fragments, which interferes with native inhibition of angiogenesis and the delivery of clotting factor VIII throughout the body.

Marfan syndrome is associated with aortic regurgitation due to aortic root dilation. Turner syndrome is associated with COA and bicuspid aortic valve. Eisenmenger syndrome is the reversal of left to right shunting.

22. A patient has history of STEMI 2 months back, came for follow up in OPD. ECG done showed persistent ST elevation. What would be the next best test for this patient?

    A. Chest X-ray

    B. Troponin

    C. CKMB

    D. Echocardiography ✓

    E. Angiography

FDP

5 d 10

Ans: Echocardiography

Explanation: The common cause of persistent ST elevation in ECG weeks after MI is LV aneurysm formation which is diagnosed with echocardiography.

23. An IV drug abuser presented with history of high grade fever associated with weight loss and fatigue. O/E a pan systolic murmur is heard at left lower sternal edge. Blood cultures were sent which were positive for methicillin resistant staphylococcal aureus. What is the treatment of choice for MRSA associated infective endocarditis?

    A. Penicillin+ gentamicin

    B. Flucloxacillin + gentamicin

    C. Vancomycin + gentamicin

    D. Ceftriaxone + gentamicin

    E. Erythromycin + gentamicin

MRSA

MRSA

[illegible] + Gentamycin

[illegible] FSGN

Ans: Vancomycin + gentamicin

Explanation: For MRSA associated IE, the drug of choice is vancomycin with gentamicin for 6 weeks. Flucloxacillin is used for MSSA infection

24. After 2 weeks of mitral valve surgery, patient developed infective endocarditis of prosthetic valve. What would be the most common culprit organism?

    2months

    A. Streptococcus bovis

    B. Streptococcus viridians

    C. S. epidermidis ✓

    D. S. aureus

E. HACEK group

Ans: S. Epidermidis

Explanation: Within first 2 months of surgery of valves, the most common organism is S. Epidermidis followed by S. Aureus. After 2 months S. Aureus and viridian's group are common organisms.

25. A 69 year old diabetic and hypertensive male patient admitted with complains of palpitations. On examination patient has irregularly irregular pulse. ECG showed absent P waves. Patient also has history of TIA in the past. What treatment you will offer for prevention of stroke?

A. Amiodarone
B. Digoxin
C. Aspirin
D. Warfarin
E. Metoprolol

CHADS VS
1 1 2 0

AF

CHADS VS
0 1 1 1 2 0 0
(5)

0-3

Ans: Warfarin

Explanation: This patient with Afib is having CHA2DS2VASc score of 5 which is a strong recommendation for warfarin therapy for prevention of stroke in future. The CHA2DS2VASc system is commonly used method to predict thromboembolic risk in atrial fibrillation. It stands for congestive heart failure, hypertension, age more than 75, diabetes, stroke or TIA, vascular disease, age between 65 to 75 and female sex. Each point has 1 score except age more than 75 and history of stroke or TIA which have scores of 2. Patient with score of 2 or more should receive full anticoagulation. Patient with score of 1 should be given aspirin or full anti coagulation based on specific individuals.

26. A 45 year old man with history of anterior wall STEMI 6 weeks back came for follow up in OPD. ECG done showed persistence of ST elevation. Physical examination showed a double apical impulse. What is the diagnosis?

A. Cardiac temponade
B. Mitral stenosis
C. Aortic stenosis
D. Hypertrophic cardiomyopathy
E. Left ventricular aneurysm

Ans: Left ventricular aneurysm

Explanation: History and ECG are typical of left ventricular aneurysm. A large aneurysm can cause a double apical impulse. The first component representing the normal apical outward movement and second the bulging of the aneurysm during peak ventricular pressures later in systole. Aneurysm forms after a transmural MI and causes dilation of left ventricular wall. Four common complications are heart failure, recurrent thromboembolism, angina and VT. It is diagnosed with echocardiography, MRI and contrast enhanced CT. Temponade presents with triad of hypotension, muffled heart sounds with raised JVP and low voltage ECG. All other options are not related to MI.

27. A young boy has been diagnosed as having aortic regurgitation. What physical finding you will find in him specifically?

Ave mur

A. Bounding pulse
B. Capillary pulsation
C. Early diastolic murmur
D. Hypertension
E. De Musset sign

Doppler
contrast

Ans: Early diastolic murmur

Explanation: The most useful finding for ruling in AR is the presence of an early diastolic murmur. It is also the most useful finding in ruling out AR. All the other peripheral hemodynamic signs show poor sensitivity and specificity for AR.

28. A 45 year old male with history of STEMI treated successfully with thrombolysis 2 weeks back came for follow up. ECG showed multiple PVCs. Patient is on aspirin, clopidogrel, atorvastatin and ramipril. What drug you will give for PVCs?

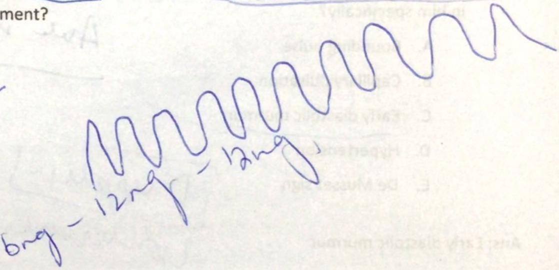
A. Amiodarone
[✓ B. Metoprolol] B.
C. Lignocaine
D. Flecainide
E. Verapamil

Ans: Metoprolol

Explanation: Patient with known CAD should be on beta blockers therapy due to their proven benefits on CV morbidity and mortality. They also suppress PVCs. PVCs in the settings of ischemia or previous infarction is associated with increased mortality; suppression of PVCs with anti arrhythmic other than beta blockers has not demonstrated any survival benefit. Class 1 antiarrhythmic like flecainide are contraindicated in post infarction stage due to their increase mortality effect. Amiodarone is used if PVCs are symptomatic and not controlled with beta blockers. Lignocaine is also used if symptoms not controlled with beta blockers. Verapamil is used if beta blockers are contraindicated. A

29. A 25 year old female admitted in emergency with sudden onset of palpitations. O/E, patient has pulse rate of 170/ min. Chest was bilaterally clear and she had blood pressure of 110/80 mmhg. ECG was done which showed narrow complex tachycardia. Vagal maneuvers were unsuccessful. What is the next best management?

    A. IV metoprolol
    B. IV Digoxin
    C. IV adenosine ✓
    D. IV Verapamil
    E. DC cardio version



Ans: IV adenosine

Explanation: History and ECG suggest the diagnosis of SVT. The first line of management is vagal maneuvers. If they are unsuccessful, then IV adenosine should be given. IV metoprolol, verapamil and digoxin are used if adenosine is not available or contraindicated. DC cardioversion is used in unstable SVT.

25.

30. A 24 weeks pregnant woman presented with acute pulmonary edema which is managed with diuretics. ECHO done showed severe rheumatic MS with mean gradient of 35 and severe pulmonary hypertension with no MR. Patient wants to continue pregnancy. What should be the next best management for her? ✓

    A. Percutaneous mitral valvotomy
    B. Open mitral valvoloplasty
    C. Mitral valve replacement
    D. Medical therapy only
    E. Watchful Observation

Ans: Percutaneous mitral valvotomy

Explanation: Percutaneous mitral valvotomy is the treatment of choice for isolated mitral-stenosis. Indication are NYHA class > II with moderate to severe MS. Its post-surgical complications are less with short term success rate approaches 100% with few maternal and fetal events. Open mitral valvoloplasty is used if percutaneous mitral valvotomy not available, but it requires GA with risk to both mother and fetus. MVR is used with MS accompanying MR.

31. Which one of the following drug prevents conversion of paroxysmal atrial fibrillation into permanent atrial fibrillation?

self limiting

A. Metoprolol

B. Digoxin

C. Amiodarone ✓

PAF

D. Procainamide

E. Verapamil

Ans: Amiodarone

Explanation: Atrial fibrillation is the most common arrhythmia. It is associated with morbidity, including stroke and heart failure, diminished quality of life, and increased mortality. AF often presents initially in a paroxysmal form and may progress to a more sustained form over time. AF becomes 'recurrent' when a patient has two or more episodes.

- Recurrent AF is either labeled 'paroxysmal' when it is self-terminating.
- 'Persistent' when it lasts more than 7 days or is terminated earlier using either pharmacological means or direct current cardioversion.
- For AF that has persisted for over a year, if a rhythm control strategy is pursued, the arrhythmia is categorized as 'long-standing persistent AF.'
- On the other hand, if the patient is in AF and attempts to maintain sinus rhythm have been abandoned, either because of futility or the preference of the patient and the physician, the AF is labeled 'permanent.

Rate-control therapy for AF is pursued with the intention of reducing symptoms and improving cardiovascular hemodynamics by allowing increased time for ventricular filling. As a treatment strategy, there is no specific effort to maintain sinus rhythm and thus no expectation that progression of AF will be prevented. Rate controlling agents like beta blockers and calcium channels blockers are used for symptoms control and have no role in preventing paroxysmal AF into permanent. Amiodarone is the most common drug used for this purpose. Flecainide and propafenone are recommended in patients without structural heart disease.

32. 15 year old boy was referred to you with an ECG which showed prolonged QT interval. Patient is not using any medications and his electrolytes are within normal limits. Family history revealed sudden death of his father in his 30s. Patient had never felt any symptoms. Given the likely diagnosis, what treatment you will recommend?

A. Reassure
B. Beta blockers ✓
C. ICD
D. ICD + Beta blocker
E. Digoxin

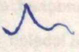
Ans: Beta blockers

Explanation: Beta-blockers are drugs of choice for patients with LQTS. The protective effect of beta-blockers is related to their adrenergic blockade, which diminishes the risk of cardiac arrhythmias. They may also reduce the QT interval in some patients. Implantable cardioverter-defibrillator (ICD) placement with beta-blockers are used for patients with a previous cardiac arrest. ICD is also used in high risk patients with history of syncope, high risk sportsman and recurrent VT.

33. A 45 year old gentleman admitted to ER with sudden collapse in the market. Patient was in ventricular tachycardia when received in ER. You had resuscitated the patient with defibrillation. Patient revived with return of spontaneous circulation and shifted to ICU. A new ECG was done which showed RBBB pattern with coved ST segment elevation in V1, V2 and V3. Given the likely diagnosis, what will be the management of choice in the future?

A. Flecainide ✓
B. Metoprolol ✓
C. ICD implant ✓
D. Reassurance ✓

V_1 V_2 V_3



E. Digoxin

Ans: ICD implant

Explanation: This is a case of Brugada syndrome which is a cause of sudden cardiac arrest. Its diagnostic criteria is J-point elevation of ≥2 mm with a coved ST segment, spontaneously evident or induced by a provocative drug challenge. There are 3 main clinical presentations:

- Polymorphic ventricular tachycardia /ventricular fibrillation associated with cardiac arrest or less frequently monomorphic VT.
- Syncope
- No symptoms.

QT. B.
Syn ICD.

There are five modalities of treatment;

- **No treatment:** The no therapy option has been recommended in asymptomatic patients who underwent EP testing that yields no inducible arrhythmias.
- **ICD implantation**: ICD therapy has been considered as the cornerstone therapy of patients with documented ventricular tachyarrhythmia, as well as those assumed to be at high arrhythmic risk.
- **EP-guided class 1A antiarrhythmic therapy (mainly quinidine).**
- **Empirical quinidine therapy:** Quinidine is used to prevent arrhythmia,
- **Epicardial ablation.**

34. Which one of the following is not an absolute contraindication to exercise testing for angina?

A. Acute MI
B. Uncontrolled heart failure
C. Acute myocarditis
D. Symptomatic aortic stenosis
E. Left main coronary stenosis

Ans: Left main coronary stenosis

Explanation: Absolute contraindications of ETT are:

- Acute myocardial infarction within 2 days.
- Unstable angina not previously stabilized by medical therapy.
- Uncontrolled cardiac arrhythmias causing symptoms or hemodynamic compromise.
- Symptomatic severe aortic stenosis.
- Uncontrolled symptomatic heart failure.
- Acute pulmonary embolus or pulmonary infarction.
- Acute myocarditis or pericarditis.
- Acute aortic dissection.

Left main coronary stenosis is a relative contraindication if the benefit of test is more than the risk.

35. The earliest sign of heart failure is:

A. S3

B. Raised JVP

[✓ C. Tachycardia]

D. Pedal edema

E. Hypotension

220/120

180

S3

Ans: Tachycardia

Explanation: Resting sinus tachycardia is the earliest sign of heart failure as body tries to compensate the low output by increasing the heart rate. S3 occurs after volume overload, raised JVP and pedal edema occurs due to congestion which is a late sign of heart failure. Hypotension also occurs in later stages.

36. Which of the following is the most common cause of death in sub acute bacterial endocarditis:

A. Bacteremia

[✓ B. Valve rupture]

C. Embolism

D. Myocardial abscess

E. Arrhythmias

Ans: Valve rupture

Explanation: Sub-acute endocarditis develops gradually over a period of weeks and months and commonly caused by viridian group. SBE involves previously abnormal valves. The most common cause of death in SBE is heart failure due to valve erosions and rupture of valve cusps. In the era of antibiotics; myocardial abscess, embolism and bacteremia are rare. IE is not associated with life threatening arrhythmias.

37. Which one of the following cardiac condition has the least risk of developing infective endocarditis?
    - A. Aortic regurgitation
    - B. Mitral regurgitation =7.
    - C. Ventricular septal defect
    - D. Mitral stenosis
    - E. Prosthetic heart valve

180

220/120

XII

Ans: Mitral stenosis

Explanation: Regurgitant lesions have more risk of developing infective endocarditis because regurgitant jet from high pressure chamber to low pressure chamber causes more damage. In AR, MR and VSD there is more risk as compared to MS, as in MS flow is from low pressure LA to high pressure LV. The presence of prosthetic heart valves is a strong risk factor for developing IE especially in early post-operative stage because endothelization of prosthetic valve starts after three months. The presence of MR has the highest risk of developing IE followed by small VSD. TS VSD

38. A patient needs dental procedure which involves manipulation of gingival tissues and manipulation of periapical region of teeth. Which one of the following heart condition does not require endocarditis prophylaxis?
    - A. Prosthetic heart valve
    - B. Previous history of IE
    - C. Unrepaired cyanotic heart disease
    - D. Mitral regurgitation ✓
    - E. Repaired congenital heart disease with regurgitation

Nor.

Rheumatic

Ans: Mitral regurgitation

Explanation: Infective Endocarditis prophylaxis is indicated only in:

- Prosthetic heart valve
- Previous IE
- Unrepaired cyanotic heart disease
- Repaired congenital heart disease with residual shunts or regurgitation
- Cardiac transplant with valve regurgitation due to abnormal valves

MRI

MS

For dental procedures, antibiotics prophylaxis is needed in all procedures which involve manipulation of gingival tissues or the periapical region of teeth or perforation of oral mucosa. It is not recommended in routine anesthesia, taking dental radiographs and for adjustment of orthodontic appliances.

39. A 23 year old primigravida presented with acute pulmonary edema. ECHO was done which showed severe mitral stenosis with moderate mitral regurgitation and severe pulmonary hypertension. Symptoms are not controlled with medical therapy. What's the next best management for this patient?

65

A. Subcutaneous valvotomy
B. Open mitral valvoloplasty
C. MVR with biological valve
D. MVR with metallic valve
E. Observation

70

Ans: MVR with biological valve

Explanation: Mitral stenosis is the most common valvular pathology in pregnancy. Mitral valve replacement is indicated in symptomatic moderate to severe MS with moderate to severe regurgitation and a severe pulmonary hypertension and who remains symptomatic despite adequate medical therapy. Biological tissue valves do not require anticoagulation and are usually considered the most suitable devices in pregnant and women of child bearing age. The need for anticoagulation is particularly problematic during pregnancy. At this procoagulant and unstable period, when protection of the mechanical valve requires the most effective drugs, warfarin use is hampered by a severe embryopathy when given in 1st trimester and fetal complications like stillbirth, prematurity and brain hemorrhage in later period. The only problem with tissue valve is their degenerative process and reoperation 10 years later. Aspirin should be used in tissue valve. Mechanical valves need lifelong anticoagulation so are not preferred, as pregnancy itself increases the risk of thrombosis. Surgery should be done in 2nd trimester around 22- 24 weeks to maximize fetal outcome. Valvuloplasty should be considered in single lesion with no regurgitation.

40. A 31 year old male with Medtronic Hall metallic mitral valve replacement done for mitral stenosis needs anticoagulation with warfarin. Patient is also in atrial fibrillation. What should be the target INR for this patient?

  A. 2.0-2.5
  B. 1.5-2.0
  C. 2.5-3.0
  D. 3.0-3.5
  E. 3.5-4.0

3.0

5.0

3.0 -

5.0

2.5

3.5

Mechan

3.0

2.5

Ans: 3.0-3.5

Explanation: Optimal anticoagulation in patients with mechanical heart valves is achieved by using a target INR. The optimal target INR depends on **the thrombotic risk** associated with **different valve types** and **patient related risk factors**. Most current valves like Carbomedics, Medtronic Hall, ATS, Medtronic open- pivot and Sorin bicarbon has low thrmbogenenicity as compared to other bileaflet valves and Lillehei- Kaster and tilting disc valves. Mitral and tricuspid valve needs high INR as compared to isolated aortic valve. Patient related risk factors are previous thromboembolism, atrial fibrillation and LVEF< 35. As this patient is having mitral valve with low thrmbogenic valve and atrial fibrillation, target INR should be 3.0 to 3.5. If no other risk factor present then 2.5 to 3.0.

AF ↑2.5

un 3.5

3.0

3.5

41. Which of the following interventions does not reduce the mortality in heart failure?

  A. Carvedilol
  B. Ramipril
  C. Sacubitril/ valsartan
  D. Digoxin
  E. Eplerenone

ACE

B.

I

Ans: Digoxin

Explanation:

- Digoxin reduces morbidity associated with heart failure but has no effect on mortality. It prevents hospitalization and improves quality of life.
- Beta blockers like carvedilol reduces morbidity and mortality by preventing ventricular remodeling by blocking beta 1 receptors.
- ACE inhibitors like ramipril, decrease peripheral resistance and reduce the load on the failing myocardium by inhibiting the conversion of angiotensin I to II, thus preventing vasoconstriction and causing relaxation of the vasculature. They reduce overall mortality risk by 27%.
- Eplerenone is a selective aldosterone receptor antagonist. Aldosterone increases sodium retention and cause myocardial fibrosis, vascular injury and dysfunction of baroreceptors leading to progression of heart failure. Eplerenone slows this process and prevents cardiac remodeling and decreases the overall mortality when used with ACEI and beta blockers.
- Sacubitril/ valsartan is a new class of drug called *angiotensin receptor neprilysin inhibitor*. It works by blocking the action of neprilysin and preventing the breakdown of natriuretic peptides, which leads to prolonged duration of the favorable effects of these peptides. Because neprilysin also breaks down angiotensin II, so inhibiting it will cause an accumulation of angiotensin, which is the reason, it is combined with valsartan. But it should never be combined with ACE inhibitors as neprilysin inhibition causes an accumulation of bradykinin and increased the risk of angioedema. They are recommended in patients with chronic symptomatic HF class II or III to further reduce the mortality in conjunction with beta blockers.

42. A 65 year old gentleman, diagnosed case of HF with EF of 25%, presented with progressive symptoms despite maximum medical therapy with ramipril, bisoprolol, spironolactone and furosemide. Patient is symptomatic even at rest. His ECG showed LBBB with sinus rhythm. What next best intervention you will advise?

35
130-149 ACB

A. Digoxin
B. Cardiac resynchronization therapy ✓
C. Continue same treatment
D. Implantable cardioverter defibrillator
E. Continuous inotropic support

Ans: Cardiac resynchronization therapy (CRT)

Explanation: CRT is recommended in heart failure with sinus rhythm, EF< 35 %, QRS duration of more than 120ms and NYHA class III despite optimal medical therapy. Electrical conduction disturbances are common in heart failure and associated with increased mortality. Delayed activation of the left free wall results in mechanical dyssynchrony and causes prolonged QRS complexes. Atrial synchronized biventricular pacing decreases all cause mortality by 25%, and hospitalization by 32%. ICD implants are used when there is an abnormal heart rhythm. In this patient CRT is better option than ICD, but ICD can be used along with CRT. Digoxin is recommended in heart failure with atrial fibrillation. Continuous inotropic support is used as palliative therapy in advance heart failure and it is associated with high mortality.

120-149 ms

43. A 45 year diabetic patient admitted with chest pain. ECG showed ST elevation in II, III and AVF. You have thrombolysed the patient. Heart rate suddenly drops to 35/min and B.P drops to 85/55 mmHg. ECG showed 3rd degree AV block. What will be your best step in management?

A. Monitor
B. IV atropine
C. Temporary pacing
D. Permanent pacing
E. IV saline

Ans: Temporary pacing

Explanation:

- Unstable complete heart block with inferior wall=> **Temporary pacing**
- Stable block or bradycardia with IWMI=> **Atropine**
- Hypotension with heart rate more than 5 in IWMI=> **Saline**
- Normal BP with HR less than 50 => **Observe**

44. Which one of the following is a cause of reverse splitting of 2nd heart sound?

A. Right bundle branch block
B. Pulmonary stenosis
C. Pulmonary hypertension

D. Left bundle branch block

E. Atrial septal defect

Ans: Left bundle branch block

Explanation: In the normal heart, S2 is usually single during expiration and is made of A2 and P2 during inspiration, A2 happens first and P2 happens later. Both A2 and P2 close when the pressure above the respective valves are greater than the pressure in the ventricles below. Given the lower vascular resistance of the pulmonary artery, during inspiration, the pulmonary artery is able to tolerate more volume of blood before the pressure above the valve increases. Additionally, during inspiration, more blood fills the right ventricle leading to a slightly longer ejection time, adding to the delayed pulmonic valve closure. Splitting is best heard in *the 2nd left ICS close to the sternal border with the diaphragm in a semi recumbent position and in quiet inspiration*. The intensity of P2 is determined relative to A2.

- Increased P2 occurs in pulmonary hypertension and ASD.
- Anything that causes delayed conduction down the right bundle like RBBB, pre-excitation of left ventricle, pacing of left ventricle, pulmonary stenosis and pulmonary hypertension lead to wide splitting of second heart sound, detected by splitting during expiration, wide during inspiration.
- **ASD** causes **fixed splitting** of second heart sound detected by presence of splitting at both inspiratory and expiratory phases but does not lengthen with inspiration.
- Paradoxical or reverse splitting occurs in LBBB, pre-excitation of right ventricle, right ventricular pacing and aortic stenosis, splitting occurs during expiration with single sound during inspiration.

45. A 75 year old lady presented to you with palpitations and dyspnea. Patient is diagnosed case of ischemic cardiomyopathy with an EF of 30%. ECG showed atrial fibrillation with ventricular rate of 145/min. What drug you will use to control ventricular rate?

    A. Flecainide

    B. Diltiazem

    C. Digoxin

    D. Verapamil

    E. Amiodarone

O AV Ischemic 160

Ans: Digoxin

Explanation: Digoxin should be used as 1st line drug in patients with CHF who are in atrial fibrillation. Verapamil and diltiazem are contraindicated in heart failure because they exacerbate it. Flecainide is also contraindicated as it increases the mortality. Amiodarone is used for rhythm control if needed.

46. A previously healthy 45 year gentleman is admitted to ER with sudden onset of SOB. Which one of the following biomarker is used to differentiate between cardiac and non-cardiac dyspnea?
    - A. CRP
    - B. Myoglobin
    - C. [✓ BNP]
    - D. Trop I
    - E. D dimers

Ans: BNP

Explanation: Brain natriuretic peptide (BNP) are released from myocardium particularly when there is increased cardiac chamber wall stretch. BNP levels < 100 pg/ml and of more than 500 have a 90% negative predictive valve and positive predictive valve, respectively, for the diagnosis of heart failure in patients presenting with acute dyspnea. BNP has both diagnostic and prognostic significance.

47. A diagnosed case of Infective endocarditis patient on treatment, complains of sudden onset of right sided body weakness. CT brain done within 2 hours of weakness is normal. What treatment should be given?
    - A. Aspirin
    - B. Clopidogrel
    - C. Warfarin
    - D. Supportive care for stroke
    - E. Heparin

MRI

MRI

Ans: Supportive care for stroke

Explanation: Embolic stroke is a common complication of IE but it occurs due to septic embolization. The only treatment is antibiotics for IE with supportive care for stroke. Antiplatelet and anticoagulant lead to hemorrhagic transformation and cause worsening of the neurological symptoms and prognosis and should be avoided.

48. A patient of Marfan syndrome becomes pregnant. The risk of aortic dissection will be more in?

- A. 1st trimester
- B. 2nd trimester
- [✓ C. 3rd trimester]
- D. Propranolol usage
- E. Post partum period

Ca 16

Ans: 3rd trimester

Explanation: Aortic dissection in pregnancy is a rare life threatening complication for both mother and fetus. It is commonly associated with CTD and trauma with most common cause being Marfan syndrome. It occurs most commonly in the third trimester due to the hyper dynamic state and hormonal effect on vasculature. Beta blockers decrease the risk of dissection.

49. A young female is diagnosed as having Prinzmetal angina, what treatment should be given to her to prevent the episodes?

- A. Aspirin
- [✓ B. Short acting nitrates]
- C. Nifedipine
- D. Atenolol
- E. Heparin

4

Ans: Nifedipine

Explanation: Prinzmetal angina is a variant of angina. The diagnostic criteria is rest angina with transient ST elevation resolved by short acting nitrates. Coronary angiography is normal with negative ETT. It is diagnosed by provocative coronary spasm testing during coronary angiography. The **acute treatment is short acting nitrates.** *Calcium channels blockers are used to prevent vasospastic episodes* and reduce cardiac events. Beta blocker are contraindicated.

50. A 40 year old patient is diagnosed as having inferior wall STEMI, has developed hypotension with normal heart rate. ECG showed ST elevation in lead III> lead II. You are suspecting right ventricular infarction. You advised right sided chest leads. Which lead has the highest sensitivity in diagnosis of RVMI?

A. V1R

B. V2R

C. V3R

D. [✓ V4R]

E. V5R

Ans: V4R

Explanation: Right ventricular infarction complicates up to 40% of inferior wall STEMI. It commonly presents as hypotension with raised JVP due to decrease RV contractility. As the right ventricle dilates, the motion and function of interventricular septum is altered, the septum shifts leftward during diastole and impedes LV filling resulting in decrease cardiac output. This is termed as loss of biventricular interdependence or **reverse Bernheim phenomena**. Disproportionate ST elevation in lead III> II is pathognomonic for RVMI and warrants a right sided chest ECG. An ST elevation in V4R > 1mm has 100% sensitivity and 90% specificity. ST elevation in right sided leads is a transient phenomena lasting less than 10 hours, so every patient with IWMI should have a right sided chest leads done at admission. Also, these patients are preload sensitive so treat with fluid loading and avoid nitrates.

51. A 16 year old female presents generally unwell with a pyrexia and painful swollen joints. She has recently suffered from a sore throat. On examination there is evidence of synovitis in the knees and ankles although on previous days it was evident in the wrists and elbows. There is abnormal involuntary movements and on cardiovascular exam there is evidence of aortic regurgitation. Her ESR and CRP were elevated. What is the most likely diagnosis?

A. [✓ Rheumatic fever]

B. Infective endocarditis

C. Still's disease

D. Atrial myxoma

E. Scarlet fever

$\frac{\boxed{2.5}}{\boxed{3.5}}$ 3.0

Ans: Rheumatic fever

Explanation: The correct answer is rheumatic fever according to the modified Jones criteria.

Modified Jones criteria for the diagnosis of RF:

Major manifestations	Minor manifestation
Carditis	Polyarthralgia
Arthritis	Fever ≥38.5°C
Sydenham chorea	Acute phase reactions: Erythrocyte sedimentation rate (ESR) ≥60 mm in the first hour and/or C-reactive protein (CRP) level ≥3.0 mg/dL
Erythema marginatum	
Subcutaneous nodules	
	Prolonged PR interval, after accounting for age variability (unless carditis is a major criterion)
	Previous history of RF and RHD

PLUS

- Supporting evidence of previous streptococcal infection (increase ASO titer or positive culture or scarlet fever).

The presence of two major criteria; or one major and two minor criteria indicates the high probability of RF if supported by the evidence of preceding streptococcal infection.

52. Which one of the following does not exacerbates digoxin toxicity?

A. Calcium gluconate

B. Magnesium sulphate

C. Alkalosis ✓ Acidosis

D. Hypokalemia ✓

E. Diuretics ✓

hyp

A B Ca^{+2}

Ans: Magnesium sulphate

Explanation: Low magnesium level increases the risk of digoxin toxicity, so magnesium therapy is not a risk factor. All other factors are associated with increased risk of toxicity.

53. A 25 year old male presents with history of ingestion of unknown quantity of digoxin. His pulse is 95/min and blood pressure 100/ 65. Labs were normal. ECG showed multiple premature beats. You administered charcoal and dig Fab fragments. After 10 mins, ECG monitor showed ventricular tachycardia. Patient is dizzy and sweaty and BP drops to 85/55 mmhg. What is the most appropriate next step?

    A. Synchronized DC cardio version
    B. Asynchronized DC cardio version
    C. IV Amiodarone
    D. IV procainamide
    E. IV phenytoin

P unstable VT

VT

VT

Ans: IV phenytoin

Explanation: Ventricular arrhythmias in the settings of digoxin toxicity are managed with phenytoin or lignocaine therapy. Cardioversion is contraindicated in digoxin toxicity because it can lead to VF.

54. A 55 year old man who had MI 6 days back, suddenly develops SOB and cough with frothy sputum. For the first time, a harsh systolic murmur is heard over the precordium. These sequence of events may be caused by?

    A. Pulmonary embolism
    B. Aortic dissection
    C. Tricuspid regurgitation
    D. Ruptured papillary muscles
    E. Ruptured aortic cusps

Ans: Ruptured papillary muscles

Explanation: Acute mitral regurgitation occurs 2 to 7 days after MI. Typical causes are papillary muscles rupture and rupture of chordae tendinea. Acute MR can be seen in 20- 40% of patients after MI that is transient. If the cause is rupture papillary muscles, it can persists. It is commonly associated with inferior wall MI. Definite treatment is valve replacement or repair. Repair is preferred over replacement to preserve LV function and improve survival with no need of anticoagulation.

55. A 35 year old lady presents with palpitations. She has no significant past medical history and does not take regular medications. Her BP was 120 / 70 mmHg and she had a heart rate of 180 bpm. An ECG confirms a narrow complex tachycardia. She was given 6 mg of adenosine with no clinical effect to the heart rate. What should be administered next?

    A. DC cardio version
    B. Amiodarone
    C. Adenosine 12 mg ✓
    D. Bisoprolol
    E. Verapamil

CMV

Ans: Adenosine 12 mg

- **Explanation**: According to ACLS guidelines;
- Patient with stable narrow complex regular tachycardia should be given IV adenosine 6mg bolus,
- If no response to initial bolus, another bolus of 12 mg should be given,
- If there is still no response, another 12 mg adenosine with total dose of 30 mg should be given.
- If the tachycardia resumes, treat with longer acting AV nodal blocking agents like verapamil or metoprolol.
- DC cardioversion is indicated in unstable SVT if patient has altered mental status, chest pain, hypotension or signs of shock.

Amiodarone is used in wide complex tachycardia or VT.

56. A 50 year old man presents with severe crushing chest pain. His ECG showed dominant R waves in V1 and V2 leads. The T waves were also tall. Which artery is most likely to be occluded?

    A. Right coronary artery
    B. Left anterior descending
    C. Left circumflex artery
    D. Posterior descending
    E. Left main stem

Ans: Posterior descending artery

Explanation: This is a case of isolated posterior wall MI. Posterior infarction is commonly associated with inferior or lateral wall MI, but can occurs as isolated in 4- 10% of infarcts. Posterior descending artery is a branch of RCA in 90% and a branch of LCX in 10 % of population. It is commonly thrmbosed in isolated posterior wall MI. As the posterior wall is not directly visualized by the standard 12 lead ECG, reciprocal changes of STEMI are sought in the anteroseptal leads V1-V3. Posterior wall MI is suggested by horizontal ST depression and tall, broad R wave in V1 to V3 with upright T waves. Posterior wall MI is confirmed by the presence of ST elevation and Q waves in posterior leads V7-9.

57. A 40 year old patient has a transthoracic echocardiogram as a follow up. He has a diagnosis of hypertrophic obstructive cardiomyopathy. Clinically he has a systolic murmur heard loudest in the right upper sternal edge. His ECG shows grossly large QRS complexes with LVH strain pattern. Which of the following is not a risk for sudden death in this patient?

A. Left ventricular outflow tract gradient of 35mmhg
B. Abnormal blood pressure response during exercise
C. Systolic anterior motion of mitral valve
D. ECG showing non- sustained VT
E. Family history of sudden cardiac death

MR SAM

Ans: Systolic anterior motion of mitral valve

Explanation: Systolic anterior motion of mitral valve on echocardiography causing left ventricular outflow tract obstruction in HOCM is a diagnostic criteria and has no role in evaluation for risk of sudden death. All other factors mentioned are risk factors for sudden cardiac arrest in HOCM and warrants prophylactic ICD implants.

Risk factors for sudden death in HOCM:

- Family history of sudden death
- Syncope
- Massive wall thickness >30 mm
- Non-sustained ventricular tachycardia in Holter monitoring of electrocardiography.
- Abnormal blood pressure response to exercise.

- Paroxysmal supraventricular tachycardia

58. A 55 year old patient who is a diagnosed case of LVF with EF of 28%, came to OPD for follow up. Current medicines include aspirin, clopidogrel, rosuvastatin, ramipril 5 mg, bisoprolol 10 mg, spironolactone 50 mg. Patient is in sinus rhythm with heart rate of 105/ min and blood pressure of 110/80. What will be your next best management step in this patient?

    A. Continue same treatment ✓

    B. Inc. bisoprolol to 20 mg OD

    C. Add diltiazem

    D. Add ivabradine ✓

    E. Add amiodarone

75mg

80%

>75

35%

Ans: Add Ivabradine

Explanation: This patient with heart failure is already on optimal therapy for heart failure with heart rate still more than 70 with maximum dose of bisoprolol. The best option for this patient is to add Ivabradine to control heart rate. Elevated resting heart rate is an independent predictor of cardiovascular morbidity and mortality in both the general population and in patients with HF, irrespective of underlying ejection fraction. The pathophysiology of this observation is multifaceted, relating to the creation of a mismatch between myocardial oxygen supply and demand at higher heart rates, with increased vascular oxidative stress, endothelial dysfunction, acceleration of atherogenesis and coronary plaque instability. Patients with HF in particular are prone to higher resting heart rates due to compensatory neurohumeral activation resulting in increased sympathetic activity. This drives an increase in oxygen demand, reduced ventricular efficiency and consequently worsens HF. It is recommended to start ivabradine to reduce risk of HF hospitalization or cardiovascular death in;

- Symptomatic patients (NYHA category II–IV).
- With severe left ventricular systolic impairment (EF ⩽ 35%)
- Who are in sinus rhythm with resting heart rate at least 70 bpm, in spite of treatment with an evidence-based dose of a β blocker (or maximally tolerated dose below that), ACEi (or ARB) and spironolactone.

- The guidance also recommends the use of ivabradine in patients with symptomatic HFrEF who are unable to tolerate, or have contraindications, to β blockers, again in conjunction with an ACEi (or ARB) and spironolactone.

59. A 19 year man presents to emergency with severe epigastric and retrosternal pain. He also gave a history of pyrexial illness over the preceding few days. He has not been able to sleep as he finds lying down extremely uncomfortable. On examination, there is a friction rub heard over precordium. ECG showed diffuse ST elevation in chest leads. Which of the following is the next best step in patient care?
    A. Thrombolytic therapy
    B. Urgent referral for PCI
    C. Ibuprofen oral
    D. Urgent CTPA
    E. Observe

Ans: Ibuprofen oral

Explanation: History, examination and ECG suggest acute pericarditis. It presents as a sharp, stabbing chest pain radiating to trapezius muscle which gets better with sitting up and leaning forward and worsened with lying down. Physical examination showed pericardial rub in some patients. The most common cause is viral infection. Typical ECG findings in acute pericarditis evolve in four stages. Within hours to days, diffuse concave ST elevation in all leads except AVR and V1 with concomitant PR depression, followed by in 1st week return to baseline and T wave flattening, followed by T wave inversions and then normalization of T waves. The treatment of choice is NSAIDs in uncomplicated cases. Colchicine is given for recurrent cases.

60. A 45 year old man with a leaking aortic valve prosthesis has fever and staphylococcus bacteremia. Whereas the initial ECG was unremarkable, after three days of IV vancomycin, gentamicin with rifampin therapy, ECG shows 1st degree heart block. Which of the following is the most likely explanation for this new change?
    A. Rifampin toxicity
    B. Septal abscess formation
    C. Vancomycin reaction

D. Worsening aortic regurgitation

E. Side effect of gentamicin

Ans: Septal abscess formation

Explanation: A new onset 1st degree heart block in IE indicates valve ring or septal abscess formation, a well recognized and much-feared complication of IE. The anatomical proximity of the aortic valve ring structure with the SA node and conducting system make this complication an urgent indication of surgery.

61. A 59 year old man presents to emergency with central crushing chest pain radiating to both arms associated with vomiting and sweating. Patient has pulmonary edema on examination. ECG showed ST elevation in leads V1, V2, V3 and V4. While you were examining the patient his pulse slows to 30/min. A repeat ECG showed complete heart block. You give him atropine 2 mg but it makes no difference. What is the next best step?

A. External pacing

B. Further atropine

C. Adrenaline

D. Isoprenaline

E. Temporary transvenous pacing ✓

Ans: Temporary transvenous pacing

Explanation: New-onset third-degree atrioventricular (AV) block (complete heart block) is a medical emergency. A patient in the acute phase of an anterior wall MI with high-grade block is at immediate danger of impending asystole and requires immediate preparation for pacing of some kind. In anterior wall MI, blocks mostly occur below the AV node and bundle of His, so atropine has little effect on heart rate. The ventricular septum and the bundle branches are supplied by LAD artery. Although the transcutaneous pacer should be placed on all patients, this mode of pacing is not highly reliable and is extremely uncomfortable for the patient. Temporary trans- venous pacing is the best option. Patient with CHB in anterior wall MI mostly needs permanent pacemaker in future.

62. A 55 year old male known to have ankylosing spondylitis is referred for evaluation of a murmur. You examined the patient. Pulse is 88/ min and bounding, BP is 140/ 60 and apex beat is in 6th

ICS that is diffuse and hyper dynamic. A diastolic murmur at left sternal edge is heard. ECHO was done which showed severe AR with an EF of 45%. What is the next best management step?

A. Start enalapril and repeat echo

B. Start nifedipine and repeat ECHO

C. Start bisoprolol and repeat ECHO

D. Aortic valve replacement

E. Observe only with periodic ECHO

Ans: Aortic valve replacement

Explanation: Asymptomatic chronic severe AR and left ventricular EF<50% is an indication for aortic valve replacement or repair. Other indications are:

- Symptomatic severe AR
- Severe AR when undergoing other cardiac surgery
- Asymptomatic severe AR with EF> 50% with LVESD>50mm

2-4.
8-12

Vasodilator therapy with ACEi or nifedipine is used when surgery is not indicated in severe AR. Beta blockers are avoided because they decrease the heart rate and increase the diastolic time and regurgitant flow, so worsens the fluid overload.

63. A 23 year old man is admitted as an emergency with sudden onset of palpitation. ECG showed atrial fibrillation with ventricular rate of 140/min. His BP was 85 systolic and he is electrically cardioverted. His baseline ECG showed a PR interval of 100 ms and a slurred onset of QRS complex. What is the long term treatment of choice?

A. Digoxin

B. Amiodarone

C. Bisoprolol

D. Radiofrequency ablation of accessory pathway

E. Verapamil

Ans: Radiofrequency ablation of accessory pathway

Explanation: This is a case of atrial fi illation as a complication of WPW syndrome. The long term treatment of choice is RFA of the acce ory pathway. Patient with AF and fast ventricular rates via an accessory pathway is an indication for F A in WPW syndrome. Digoxin and verapamil are contraindicated as long term therapy as these medicatio enhance antegrade conduction through the accessory pathway by increasing the refractory period in th AV node. Beta blockers are used in acute presentation.

Remember verapamil death syndrome when it is used in WPW syndrome and wide complex tachycardia.

64. A 73 year old woman collapses in the ward just 24 hour after PPM insertion for episodes of complete heart block. On examination patient has a thready pulse of 125/min, BP of 80/ 50 mmHg and RR of 25 /min. Her JVP was raised which further raised with inspiration. ECG showed small complexes. What is diagnosis?
    - A. Pulmonary embolism
    - B. Pneumothorax
    - C. Acute coronary syndrome
    - D. Cardiac temponade
    - E. Septic shock

Ans: Cardiac temponade

Explanation: This is a case of acute cardiac temponade as a complication of PPM insertion. It is a syndrome caused by sudden accumulation of fluid in the pericardial space resulting in reduced ventricular filling and hemodynamic compromise. **The classic Beck triad of raised JVP with hypotension and diminished heart sounds is observed in acute temponade.** It is also associated with tachycardia, pulsus paradoxus, Kussmaul sign, and absent Y descent on JVP. The treatment is pericardiocentesis.

65. A patient of heart failure came to you in OPD complaining of seeing stars when he closes his eyes and sensations of enhanced brightness in a fully maintained visual field. Which drug causes such symptoms?
    - A. Ramipril
    - B. Carvedilol
    - C. Digoxin
    - D. Ivabradine

E. Ranolazine

Ans: Ivabradine

Explanation: Visual phenomena like phosphenes or luminous phenomena is a side effect of Ivabradine. Patient commonly complains of seeing stars or bright spots in their fields of vision. Digoxin causes blurred or yellow vision. Ranolazine causes blurred vision.

66. **Which test is used to confirm the diagnosis of cirrhotic cardiomyopathy in patient of cirrhosis as work up before liver transplant?**
    - A. Transthoracic echocardiography
    - B. Dobutamine stress ECHO
    - C. Exercise tolerance test
    - D. Thallium scan
    - E. Angiography

Ans: Dobutamine stress ECHO

Explanation: Cirrhotic cardiomyopathy is characterized by the impaired systolic response to physical stress, diastolic dysfunction, and electrophysiological abnormalities, especially QT interval prolongation. The recognition of this disease will prevent the complications of overt heart failure after procedures such as transjugular intrahepatic portosystemic shunt (TIPS) and liver transplantation. Echocardiography is mostly normal in these patients, so dobutamine stress ECHO is commonly used for screening to detect this problem.

67. A 22 year old boy presented with recurrent episodes of loss of consciousness associated with palpitations and severe pallor for half a minute. The most appropriate investigation to reach the diagnosis is:
    - A. Echocardiography
    - B. Electrocardiography
    - C. Angiography
    - D. Electroencephalography
    - E. Holter monitoring

Ans: Holter monitoring

Explanation: A Holter monitor is an ambulatory electrocardiographic system which is used to detect intermittent rhythm disorders. Common indications are:

- To diagnose the cause of syncope or near syncope
- To establish the link between palpitations and abnormal heart rhythms
- To evaluate transient episodes of cardiac arrhythmias or myocardial ischemia
- Patients with neurologic events when transient atrial fibrillation or flutter is suspected
- To stratify the risk of sudden cardiac death

If symptoms occur rarely then event recorder or implantable loop recorder is used.

68. Which valve is commonly involved in calcification?

    A. Mitral

    B. Tricuspid

    C. Aortic ✓

    D. Pulmonary

    E. Prosthetic

MR

TR

MR

MS

PS

Ans: Aortic

Explanation: Aortic valve calcification is present in approximately 20–30% of individuals aged over 65 years and in 48% of patients over 85 years. It is the most common cause of aortic stenosis in old age. Aortic valve is subject to large mechanical stresses throughout the cardiac cycle. In response to this mechanical loading, valves undergo constant renewal and this fact favors valve pathology. The highest stress occurs in the areas of flexion of the leaflet. In these areas of increased mechanical stress, the process begins and bending force, pressure, and shear forces will induce calcification by damaging the structural integrity of the leaflet tissue. At present it is considered that mechanical stimuli play an important role in valvular calcification.

69. A 23 year old female presents with palpitations intermittently. She is known to suffer from anxiety attacks. However, on auscultation of the heart there is evidence of a late systolic murmur with a mid-systolic click. It's worsened by the standing position. What is the most likely diagnosis?

A. Aortic stenosis

B. Mitral valve prolapse

C. Mitral stenosis

D. HOCM

E. Atrial myxoma

Ans: Mitral valve prolapse

Explanation: Mitral valve prolapse (MVP), also known as floppy mitral valve syndrome, systolic click-murmur syndrome, and billowing mitral leaflets, is a valvular heart disease disorder. The disorder produces symptoms as a result of a redundant and abnormally thickened mitral valve leaflet prolapsing into the left atrium during systole.

- Mitral valve prolapse is the most common pathology leading to mitral regurgitation.
- MVP is usually identified during a clinical exam on cardiac auscultation.
- Echocardiography confirms the diagnosis.
- This disorder is the most common cause of the non-ischemic mitral valve regurgitation.
- MVP can be asymptomatic and can also present with symptoms of atypical chest pain, palpitations, dyspnea on exertion, and exercise intolerance.
- Other symptoms such as anxiety, low blood pressure, and syncope suggest autonomic nervous system dysfunction.
- In MVP, the mid-systolic click is followed by a late systolic murmur. This finding is commonly heard at the apex.
- The murmur of MVP varies with position. The murmur is accentuated when the patient is standing and in the Valsalva maneuver (systolic click comes earlier, and the murmur is longer) and diminishes when the patient is squatting (systolic click comes later, and the murmur is shorter).
- The murmur of MVP is similar to the murmur of hypertrophic cardiomyopathy.
- A mid-systolic click is diagnostic of MVP.

The handgrip maneuver increases the murmur of MVP and decreases murmur of hypertrophic cardiomyopathy. The handgrip maneuver also decreases the duration of the murmur and delays the timing of the mid-systolic click in MVP. Atrial myxoma has mid diastolic murmur changed with position. AS has ejection systolic murmur.

70. A 23 year old female who has history of a cardiac condition wants to start a family with her husband and has been referred to the cardiology clinic for advice. What condition is an absolute contra indication to pregnancy?

A. Patent foramen ovale
B. Bicuspid aortic valve
C. Atrial septal defect
D. Primary pulmonary hypertension ✓
E. Mitral valve prolapse

Ans: Primary pulmonary hypertension

Explanation: Absolute contraindication of pregnancy are:

- Primary pulmonary hypertension
- Severe obstructive fixed lesions like MS, AS, HOCM, coarctation of aorta
- Marfan syndrome with aortic diameter more than 4.5cm
- Severe mitral stenosis
- Severe symptomatic aortic stenosis
- Severe ventricular dysfunction (EF<30%).
- Previous peri-partum cardiomyopathy with any residual impairment of left ventricle function.
- Severe coarctation of aorta
- Aortic dilatation>50mm in aortic diseases associated with bicuspid valve.

All other are relative contraindication.

71. A 25 year old gentleman comes to you with recurrent attacks of syncope. He told you that he feels nauseated before the attack and then fell down and remain unconscious for 1 minute. He had urinated during one of the attack but after 1 min he became fully conscious with no confusion. Which one of the following investigations you will order to confirm your diagnosis?

2.5

3

A. Echocardiography
B. 24 hour Holter monitoring
C. Electroencephalography

D. Tilt table test

E. Polysomnography

Ans: Tilt table test

Explanation: The history is suggestive of vasovagal syncope which is confirmed by tilt table test. Echocardiography and Holter monitoring is used in evaluation of cardiac syncope. EEG is used for epilepsy. Polysomnography is used for sleep disorders.

72. Which one of the following is not a cause of predominant R wave in lead V1 and V2?

A. Right bundle branch block

B. Pulmonary hypertension

C. Posterior wall MI

D. WPW syndrome

E. Aortic stenosis

Ans: Aortic stenosis

Explanation: Normally, in lead V1 and V2, S wave is predominant with a small R wave. Causes of predominant R wave in V1 and V2 are:

- Right bundle branch block
- Right ventricular hypertrophy
- Severe pulmonary Hypertension
- Posterior wall MI
- WPW syndrome type A
- Dextrocardia
- Duchenne muscular dystrophy

73. Which one of the following is the empirical treatment of choice in prosthetic valve Endocarditis?

A. IV amoxicillin

B. IV flucloxacillin+ gentamicin

C. IV vancomycin+ gentamicin

D. IV vancomycin+ gentamicin+ rifampin

E. IV ceftriaxone+ gentamicin

Ans: IV vancomycin+ gentamicin+ rifampin

Explanation: IV vancomycin+gentamicin+ rifampin is the empirical treatment of choice in prosthetic heart valve endocarditis.

74. Which one of the following conditions causes sudden death at night or during rest?

A. Long QT1 syndrome

B. Long QT2 syndrome

[✓ C. Long QT3 syndrome]

D. HOCM

E. Brugada syndrome

CRF

Ans: Long QT3 syndrome

AS Angio

Key.

Explanation:

- Long QT3 is associated with events mostly at night time or during rest.
- LQT1 is associated with exertional syncope often swimming.
- LQT2 is associated with syncope following emotional stress.
- HOCM is associated with death during exercise or playing.

75. A 72 year old man is diagnosed as having severe aortic stenosis, after he presented with three episodes of syncope and chest pain on exertion. He opts for open surgical valve replacement. What other investigation is warranted before proceeding to valve replacement?

A. Exercise tolerance testing

B. Dopamine stress ECHO

C. 24 hour Holter monitoring

D. Transesophageal ECHO

[✓ E. Coronary angiography]

Ans: Coronary angiography

Explanation: Patients undergoing open surgical valve replacement should first undergo coronary angiography to exclude any coronary stenosis that could be treated with bypass grafting simultaneously. ETT should be avoided in symptomatic severe AS. Dopamine stress ECHO is used in low output state to differentiate between true and false valve area.

76. Which of the following chemotherapeutic agents causes cardiomyopathy?
   - A. Bleomycin
   - B. [✓ Doxorubicin]
   - C. Methotrexate
   - D. Cyclophosphamide
   - E. Busulpahn

Ans: Doxorubicin

Explanation: Doxorubicin causes cardiomyopathy which is diagnosed with MUGA scan. Bleomycin, methotrexate and busulpahn cause pulmonary fibrosis. Cyclophosphamide causes hemorrhagic cystitis.

77. A diabetic patient admitted with STEMI was using metformin 850mg and gliclazide 60 mg. His blood sugars are 210 to 290 since his admission. How should you manage his diabetes?
   - A. No change in medication
   - B. Increase metformin to 1g BD S/S
   - C. Increase gliclazide to 60 mg BD
   - D. Ultrashort acting insulin
   - E. [✓ Regular insulin sliding scale]

Ans: Regular insulin sliding scale

Explanation: Dose- adjusted insulin with regular monitoring of blood sugar is recommended in acute myocardial infarction. This strategy lower mortality at one year and is recommended. Ultrashort acting insulin is not recommended. Metformin has the potential to induce lactic acidosis in the context of any kind of ischemia and should be avoided. Sulfonylureas also cause hypoglycemia and worsen the ischemic, so should also be avoided.

78. A patient is diagnosed as having anterior wall STEMI was given streptokinase. After 90 minutes of SK therapy, ECG was done which showed ST elevation which was 20% less than the admission ECG. Next best step in management will be?

A. Repeat SK

B. Give alteplase

C. Rescue PCI

D. Heparin infusion

E. Observe

50%

Ans: Rescue PCI

Explanation: Approaches to assess reperfusion following fibrinolytic therapy are imprecise and include:

- Improvement in or relief of chest pain.
- Resolution of ST elevation.
- Presence of reperfusion arrhythmias (such as accelerated idioventricular rhythm).

90 min

Findings which are highly predictive of successful reperfusion include:

- ✓ Relatively sudden and complete relief of chest pain plus > 50% reduction in ST elevation.
- ✓ Complete or near complete resolution of ST elevation at 60-90 minutes after fibrinolytic therapy.

Combination of < 50% resolution of ST elevation and absence of reperfusion arrhythmias at 2 hours after treatment predicts failure of reperfusion with sensitivity 81%, specificity 88%, positive predictive value 87% and negative predictive value 83%.

Absence of > 50% reduction in ST elevation in the worst lead at 60-90 minutes should prompt strong consideration of coronary angiography and rescue percutaneous coronary intervention (PCI).

79. In Stokes- Adams attack with recurrent syncope, the most common cause is?

A. Ventricular tachycardia

B. Atrial fibrillation

C. Complete heart block

D. Supraventricular tachycardia

E. Tachy- brady syndrome

Ans: Complete heart block

Explanation: Stokes- Adams attacks are a cause of recurrent syncope with a typical episode presents with sudden loss of consciousness without any warning. There is pallor and death like appearance during the attack, but when the heart starts beating again, there is a characteristic flush. These episodes of asystole result from CHB or Mobitz type 2 block most commonly. It can also occurs in SA node dysfunction. Treatment is PPM.

80. Dressler syndrome after myocardial infarction occurs due to:

A. Viral infection

B. Myocardial rupture

C. Autoimmunity

D. Bacterial infection

E. Drug reaction

Ans: Autoimmunity

Explanation: Dressler syndrome or post- MI syndrome is characterized by persistent fever and pleurisy and occurs due to autoimmunity. The symptoms occur a few weeks or even months after the infarct. Prolonged or severe symptoms are treated with high dose aspirin.

81. Adequate rate control in a patient with AF is defined as:

A. Resting HR 80, maximal HR 110 during a 6-minute walk

B. Resting HR 60, maximal HR 110 during a 6-minute walk

C. Resting HR 80, maximal HR 140 during a 6-minute walk

D. Resting HR 100, maximal HR 140 during a 6-minute walk

E. Resting HR 80, maximal HR 140 during a 6-minute walk

Ans: Resting HR 80, maximal HR 110 during a 6-minute walk

Explanation: Adequate rate control in patients with AF is defined as a resting HR 80 bpm and maximal HR 110 bpm during a 6-minute walk. Rate control can be achieved with a variety of medications. Digoxin alone is often insufficient to control HR during exercise.

82. Regarding defibrillation in ACLS, all are true except:
   - A. Given in ventricular fibrillation
   - B. Three consecutive shocks are given 60'
   - C. CPR resumed after each shock
   - D. Biphasic shock defibrillator should be used
   - E. Start as early as possible

Ans: Three consecutive shocks are given

Explanation: Defibrillation is used in pulseless VT and ventricular fibrillation. These two conditions should be treated with immediate defibrillation. Defibrillation is more likely to be effective when a biphasic shock defibrillator is used. Defibrillation is usually administered immediately and after the shock, CPR is immediately resumed without attempting to confirm the restoration of pulse. If after 2 minutes of CPR, a pulse is not restored, a further shock is given. So three consecutive shocks are not indicated.

83. Which of the following statements about CVD risk reduction in patients with T2DM is accurate?
   - A. High-intensity statins are recommended for nearly all patients with T2DM
   - B. Therapy to reduce triglycerides is an important component of CVD risk reduction
   - C. Treatment of hypertension to blood pressure < 130/80 mm Hg is recommended
   - D. Aspirin therapy is recommended as secondary prevention in individuals with T2DM and a history of atherosclerotic CVD 130
   - E. Pioglitazone should be used in heart failure patients

Ans: Aspirin therapy is recommended as secondary prevention in individuals with T2DM and a history of atherosclerotic CVD.

Explanation: According to 2020 Cardiovascular Disease and Risk Management guidelines from the ADA, aspirin therapy (75-162 mg/day) is recommended as secondary prevention in individuals with T2DM and a history of atherosclerotic CVD. Clopidogrel can be substituted when aspirin is contraindicated. ESC guidelines suggest that aspirin be used as primary prevention for individuals with diabetes and high or very high CVD risk.

High-intensity statins are typically reserved for individuals with overt CVD (including previous cardiovascular events or acute coronary syndrome) and/or CVD risk factors. Moderate-intensity statins are recommended for the majority of patients with diabetes.

Although patients with T2DM commonly have elevated triglycerides, therapy to reduce triglycerides has not yet been shown to reduce CHD events. Control of hypertension is an important strategy for CVD risk reduction among individuals with T2DM. Randomized clinical trials have clearly shown that treatment of hypertension to blood pressure < 140/90 mm Hg reduces both cardiovascular events and micro vascular complications.

Pioglitazone is contraindicated in heart failure.

84. During cardiopulmonary stress testing with the 6-minute walk assessment, what distance walked is considered a normal value?

A. 300 feet
B. 1500 feet
[✓ C. 600 feet]
D. 900 feet
E. 1200 feet

80mu

110

Ans: 1500 feet.

Explanation: When patients participate in cardiopulmonary stress testing with the 6-minute walk test, a normal value is considered to be 1500 feet. Anything less than that value may indicate cardiac dysfunction. Those patients who cannot walk more than 600 feet have severe cardiac dysfunction and are more likely to have worse short- and long-term prognosis.

85. Which of the following is an appropriate anticoagulation strategy for patients with nonvalvular AF?

A. Dual antiplatelet therapy
B. LMWH

C. Unfractionated heparin

D. Warfarin

E. Rivaroxaban

Ans: Rivaroxaban

Explanation: Anticoagulation for nonvalvular AF is managed with one of the DOAC agents. Currently available DOAC agents include factor Xa inhibitors (apixaban, edoxaban, or rivaroxaban) and the direct thrombin inhibitor dabigatran. DOAC agents can be initiated prior to cardioversion and do not require a bridge from heparin or low-molecular weight heparin.

Advantages to treating AF with DOAC agents over warfarin include:

- Less drug-drug and diet interactions with non–vitamin K oral anticoagulant agents
- Bridging anticoagulation therapy is unnecessary due to the rapid onset and offset of non–vitamin K oral anticoagulant agents
- Lower risk of intracranial hemorrhage

86. Peri operative risk of ischemia is highest in the presence of:

A. Mil hypertension

B. Hypotension

C. Tachycardia

D. Use of opioid

E. Isoflurane use

Ans: Tachycardia

Explanation: Peri operative ischemia and infarction are related to tachycardia and have no relation with hypotension or drugs. There is beneficial effects of beta blockers in reducing the occurrence of ischemia if beta blockers are used before surgery. No effects of opioid or Isoflurane in the development of ischemia. Mild to moderate hypertension does not increase the risk of ischemia, but severe hypertension is associated with highest risk of peri-operative ischemia and infarction.

87. Which one of the following interventions has no role in the management of NSTEMI?

A. Aspirin ✓
B. Enoxaparin ✓
C. Clopidogrel ✓
D. Alteplase
E. Fondaparinux

Ans: Alteplase

Explanation: Thrombolysis should be avoided in NSTEMI because non- occlusive narrowing of the coronaries leads to NSTEMI. The clot in NSTEMI is a platelet-rich clot with a fibrin cap which only partially occludes the coronary artery. Thrombolysis in NSTEMI may expose and release the underlying platelets into circulation likely leading to further fresh thrombi. Risk of thrombolysis outweighs the benefits in this group of patients. A combination of aspirin, clopidogrel, heparin or fondaparinux formed the major therapeutic protocol in these patients.

24

88. Most common artery involved in Prinzmetal angina is:

A. LAD
B. LCX
C. Obtuse marginal
D. RCA ✓
E. Posterior descending

short acting nitrates

RCA

nef

nifedipine

Ans: RCA

Explanation: RCA is the most commonly involved artery in Prinzmetal angina.

89. Which one of the following is a predictor of risk of myocardial infarction?

A. CPK ✓
B. Troponin ✓
C. CRP ✓
D. LDH ✓
E. Plasmin

HR

MS

Ans: CRP

Explanation: C-reactive protein (CRP), a marker of inflammation that has been shown in multiple studies to predict incident myocardial infarction, stroke, peripheral arterial disease, and sudden cardiac death. CRP levels have also been shown to predict risk of both recurrent ischemia and death among those with stable and unstable angina, those undergoing percutaneous angioplasty, and those presenting to emergency rooms with acute coronary syndromes. CRP levels >3 mg/L represent a high-risk group. All other tests are used in the diagnosis of MI and cannot predicts the risk.

90. The Osborn wave or J wave in ECG is diagnostic of which condition?
    - A. Subarachnoid hemorrhage
    - B. Hyperkalemia
    - C. [✓ Hypothermia]
    - D. Hypokalemia
    - E. Hypoglycemia

Ans: Hypothermia

Explanation: The Osborn wave (J wave) is a positive deflection at the J point usually most prominent in the precordial leads. There are other causes of J wave elevation, but in the setting of hypothermia this phenomenon is most commonly referred to as an Osborn wave. Compared to other hypothermia-induced ECG abnormalities (e.g. sinus bradycardia; supraventricular arrhythmias, QT prolongation and AV block) the Osborn wave is thought to be the most specific.

91. Which one of the following is the primary cause of in hospital death from STEMI?
    - A. Ventricular tachycardia
    - B. Free wall rupture
    - C. Cardiac temponade
    - D. Heart block
    - E. [✓ Pump failure]

Ans: Pump failure

Explanation: Pump failure is the primary cause of in hospital death is STEMI. Arrhythmias are cause of pre hospital death.

92. Which one of the following is the primary reperfusion arrhythmia following thrombolysis?

A. Atrial fibrillation

B. Accelerated idioventricular rhythm

C. Sinus bradycardia

D. Ventricular tachycardia

E. Sinus tachycardia

Ans: Accelerated idioventricular rhythm

Explanation: AIVR results when the rate of an ectopic ventricular pacemaker exceeds that of the sinus node. Often associated with increased vagal tone and decreased sympathetic tone. AIVR is classically seen in the reperfusion phase of an acute STEMI, e.g. post thrombolysis. ECG features are:

- Regular rhythm.
- Rate 50-110 bpm.
- Three or more ventricular complexes.
- QRS complexes >120ms.
- Fusion and capture beats.

RCA

93. Which one of the following is the investigation of choice in aortic dissection?

A. Chest X-RAY

B. Arterial enhanced CT

C. Transesophageal ECHO

D. MR angiography

E. Digital subtraction angiography

Ans: Arterial enhanced CT

Explanation: CT, especially with arterial contrast enhancement is the investigation of choice, able not only to diagnose and classify the dissection but also to evaluate for distal complications. It has reported sensitivity and specificity of nearly 100%. Chest radiography may be normal or demonstrate mediastinal widening with double and irregular aortic contour. Transesophageal echocardiography (TOE) has very high sensitivity and specificity for assessment of acute aortic dissection, but due to limited access and its [illegible] nature it was largely been replaced by CTA. Although, in general MRA has been reserved for follow-up examinations, rapid non-contrast imaging techniques may see MRI having a larger role to play in the acute diagnosis, particularly in patients with impaired renal function. It has similar sensitivity and specificity to CTA but suffers from limited availability and the difficulties in performing MRI on acutely unwell patients. Digital subtraction angiography has historically been the gold standard investigation. CTA has now replaced it as the first-line investigation.

94. A patient presented with sudden onset of chest pain with sweating. His blood pressure is 170/110. X-ray showed mediastinal widening. CTA done which showed type B aortic dissection. What is the best treatment for this patient?
    - A. Emergency surgery
    - B. IV labetalol ✓
    - C. IV verapamil
    - D. IV nitroprusside
    - E. Observation

CTA

TIA

[illegible]

CTPA

Ans: IV labetalol

Explanation: Type B aortic dissection does not involve ascending aorta and is treated medically. The aim of treatment is to maintain a MAP of 60-75 to reduce the force of the ejection of blood from the LV. Drug of choice is IV labetalol. Verapamil is used if beta blockers are contraindicated. Nitroprusside is mostly avoided as it can cause coronary steel syndrome. Surgery in indicated in type A dissection involving ascending aorta or in type B when there is vital organ ischemia as morbidity and mortality associated with surgery is very high.

95. Which investigation is used in screening and surveillance of abdominal aortic aneurysm?
    - A. X-ray abdomen
    - B. Ultrasound ✓
    - C. Doppler ultrasound
    - D. CT scan
    - E. Angiography

3cm

3-④

4-4.5 6mon

7.

Ans: Ultrasound

Explanation: Abdominal aortic aneurysms are typically asymptomatic and identification is achieved by imaging. Ultrasound is the method of choice for AAA screening and surveillance as it is non- invasive and inexpensive. Sensitivity is 90% and specificity is 99%. CTA is required for decision regarding repair and used as pre operative investigation as it gives information about surrounding structures and accurate size of aneurysm. It cannot be used in screening and surveillance due to high cost and risk of radiation exposure.

96. Tuberculous aneurysm involve which portion of aorta?
    - A. Ascending
    - B. Arch of aorta
    - C. Thoracic
    - D. Suprarenal abdominal
    - E. Infrarenal abdominal

3-

3-4

4-4.5

6-

7 4.5 surg

3-4

4-5

Ans: Thoracic

Explanation:

- Tuberculous aneurysm typically affects the thoracic aorta as it results from direct extension of infection from hilar lymph nodes or contiguous abscesses as well as from bacterial seeding.
- Syphilis involves ascending aorta and arch of aorta.
- Atherosclerosis is the most common cause of infrarenal abdominal aortic aneurysm.
- Mycotic aneurysms are commonly located in suprarenal abdominal aorta.

97. A 55 year old male presented with complaints of cramps in calf muscles during walking which gets better with rest. Examination showed brittle nails and smooth and shiny skin on both feet. An ankle brachial index was 0.7. What is the next best test in this patient?
    - A. Duplex ultrasound
    - B. MR angiography
    - C. CT angiography
    - D. Treadmill testing
    - E. Transcutaneous oximetry

0.7

SHE

CT-A

MRA

du..

A.

Ans: Duplex ultrasound

Explanation: This is a case of intermittent claudication. The next best imaging modality is duplex ultrasound which is used to image stenotic lesions. MRA and CTA should not be used in routine diagnostic testing but are performed before potential revascularization. Treadmill testing is used to assess functional limitations of the disease. Transcutaneous oximetry has poor specificity.

98. A 40 year old smoker presents with recurrent superficial vein thrombophlebitis of feet and Raynaud's phenomena. CT angiography showed smooth and tapering segmental lesions in tibial arteries with normal femoral and popliteal arteries. What is the next best treatment step in this patient?

    A. Aspirin
    B. Warfarin
    C. Smoking succession ✓
    D. Nifedipine
    E. Antibiotics

DVT

Ans: Smoking succession

Explanation: This is a case of thromboangitis obliterans which is an inflammatory occlusive vascular disease involving small and medium size arteries and veins in the distal extremities. This disorder develops commonly in male with age > 40 and smokers. It presents with triad of symptoms of claudication, Raynaud's phenomena and migratory superficial vein thrombophlebitis. Only distal vessels are involved with sparing of proximal vessels. There is no specific treatment for this except abstention from tobacco. No role of antiplatelet, anticoagulation and antibiotics. Severe symptoms lead to amputation.

99. A 55 year old male with history of IHD presented with history of sudden severe pain in left leg 1 hour back. Examination showed loss of all the pulses below the mid thigh with loss of touch sensation. What is the best treatment for him?

    A. Unfractionated heparin
    B. Low molecular heparin
    C. Warfarin
    D. Revascularization ✓
    E. Aspirin and clopidogrel ✓

Ans: Revascularization

Explanation: This is a case of acute limb ischemia and immediate revascularization is required in all cases of symptomatic acute limb ischemia. Revascularization should be accomplished within 3 hours as the risk of irreversible tissue damage approaches 100% at 6 hours. Heparin unfractionated should be given at diagnosis and it may improves the symptoms but revascularization is the best treatment.

100. In patients with mitral stenosis, AF is considered as valvular when mitral valve area is:

A. <1.5 cm2 ✓
B. < 2 cm2
C. < 1cm2
D. < 2.5 cm2
E. < 3 cm2

1 cm²

Doppler

CTA | MRA

Ans: <1.5 cm2

Explanation: Atrial fibrillation in the presence of rheumatic moderate to severe mitral stenosis and prosthetic heart valves is called valvular atrial fibrillation and anticoagulation of choice in these patients is warfarin. Moderate MS is called when valve area is less than 1.5 cm2. All other atrial fibrillation are non valvular.

101. Which one of the following is a cause of high triglycerides level with elevated HDL level?

A. Diabetes ✓
B. Nephrotic syndrome Re.
C. Alcohol intake
D. Anabolic steroids
E. Hypothyroidism

Initial

Doppler

DVT

CTA

Duplex

CT | Ven

MRV

Ans: Alcohol intake

Explanation: High TG with high HDL is a classic example of alcohol intake. Other example is estrogen administration. Normally TGs and HDL are typically inversely related.

102. A known case of IHD patient comes to you with complaints of muscle pains more in the morning. Patient also complains of weakness in muscles. On examination proximal muscles are tender. What next test you will order?

A. Troponin

B. CRP

C. ANA

D. CPK

E. BNP

Ans: CPK

Explanation: This is a case of statin induced myopathy. Statins are indicated in secondary prevention in IHD. Myopathy is a common side effects of statins. There are four different clinical scenarios of myopathy. Rhabdomyolysis, myalgia, and mild hyperCKemia, self-limited toxic statin myopathy and immune-mediated necrotizing myopathy. CPK is used for its confirmation.

103. Which one of the following is an indication of high intensity statin therapy?

A. IHD with age of 80

B. Diabetes with LDL of 110 and 10 year CVD risk of 7%

C. An LDL level of 225

D. An LDL of 125 without DM

E. An HDL level of 30

HDL

Ans: An LDL level of 225.

Explanation: High intensity statins lower LDL cholesterol by approximately 50%. Examples are atorvastatin 40-80 mg and rosuvastatin 20-40 mg. Indication of high intensity statins are:

- Presence of clinical atherosclerotic CV disease with age less than 75
- Primary elevation of LDL > 190
- Presence of diabetes with LDL of more than 70 and 10 year CVD risk of more than 7.5% or higher with age 40-75.

104. which of the following is the most common valvular pathology associated with rheumatoid arthritis?

A. MS

B. MR

C. AR

D. AS

E. PR

Ans: MR

Explanation: The most prevalent valve disease in RA is mitral valve insufficiency, varying from 30 to 80% followed by aortic valve insufficiency varying from 9 to 33%.

105. A 25 years old female is diagnosed as having rheumatic mitral stenosis. She remembers having fever with joint pains 2 years back. For how long secondary prophylaxis should be given to her?

NO.

A. For 3 years

B. For 10 years

C. For 15 years

D. No need of prophylaxis now

E. For 2 years

5 21.
Cu.
21
10
10
40
5 15

Ans: For 15 years

Explanation: The mainstay of controlling RF is secondary prevention as these patients are at higher risk than the general population of developing a further episode of acute RF. They should receive long term penicillin prophylaxis. The best option is benzathine penicillin 1.2 millions units for weight > 27 and 600,000 units for < 27 kg every 4 weeks. The duration depends on many factors including;

- Duration of last episode as recurrence becomes less likely with increasing time,
- Age, as recurrence less likely with increasing age.
- Presence of residual valvular disease.

Common duration for different categories are:

- Rheumatic fever without carditis-> **for 5 years after the last attack or 21 years of age whichever is longer**

- RF with carditis but no residual valvular disease-> **for 10 years after the last episode or 21 year of age whichever is longer**
- RF with persistent valvular disease, evident clinically or on echocardiography-> **for 10 years after the last attack or 40 years of age whichever is longer, sometimes lifelong.**

As patient has persistent valvular pathology and she is 25 years old, so she should be given prophylaxis up to 40 years.

106. Cardiac troponin are raised in all of the following except:

A. SVT

B. Sepsis

C. Myocarditis

D. Unstable angina

E. Pulmonary embolism

Ans: Unstable angina

Explanation: Conditions other than MI associated with myocardial injury and raised troponin are:

- Tachyarrhythmia
- Heart failure
- Hypertensive emergency
- Critical illness e.g. shock/sepsis/burns
- Myocarditis
- Takotsubo cardiomyopathy
- Aortic stenosis
- Pulmonary embolism
- Chronic kidney disease
- Cardioversion or cardiac contusion
- Drug toxicity like doxorubicin

In UA, troponin are normal and this is used to differentiate UA from NSTEMI.

107. Which one of the following biomarkers is not recommended for prognostic purpose in established MI?

A. Troponin T

B. BNP

C. Creatinine

[✓ D. CRP]

E. Glucose

7.7

Ans: CRP

Explanation: Beyond diagnostic utility, initial cardiac troponin levels add prognostic information in terms of short and long term mortality in MI. While high sensitivity trop I and T have comparable diagnostic accuracy, Trop T is used for prognostic accuracy. Higher the peak value, higher the risk of death. Serum creatinine and eGFR should be done in all patients because they also affect prognosis. Similarly, BNP and pro BNP provide prognostic information regarding the risk of death, heart failure and development of AF, so they are also recommended. Glucose levels is also recommended for prognostic significance. CRP have some prognostic significance but in guidelines it is not recommended routinely.

108. A patient with history of ischemic stroke 6 months back presented in emergency with a diagnosis of NSTEMI, which drug is contraindicated in this patient?

A. Aspirin

B. Clopidogrel

C. Prasugrel

D. Ticagrelor

E. Cangrelor

Ans: Prasugrel

Explanation: Prasugrel is an irreversible P2Y12 receptor inhibitor and used in the management of NSTEMI. Its loading dose is 60 mg followed by 10 mg per day maintenance dose. History of prior stroke is a contraindication for its use. All other antiplatelet agents can be used in history of stroke. Currently, DAPT containing aspirin and potent P2Y12 receptor inhibitor ticagrelor or prasugrel is the recommended standard treatment for NSTEMI. Clopidogrel is less potent and used only when these drugs are contraindicated or not available. The possible benefit of prasugrel is also related to improvement in endothelial function.

109. Which novel oral anticoagulant (NOAC) can be used in ESRD on dialysis?

A. Rivaroxaban

B. Apixaban

C. Dabigatran

D. Edoxaban

E. Argatroban

Ans: Apixaban

Explanation: Apixaban can be used in patients on dialysis, all other NOAC should be avoided.

110. A 65 year old hypertensive and diabetic male with a history of persistent non valvular atrial fibrillation, admitted with chest pain. ECG showed ST segment depression in lateral leads. Troponin was positive. What should be the long term treatment for this patient?

A. Aspirin and clopidogrel for 12 months

B. Aspirin alone for lifelong

C. Aspirin+clopidogrel+rivaroxaban for 12 months

D. Clopidogrel+ rivaroxaban for 12 months

E. Aspirin + rivaroxaban for 12 months

(lifelong).

Aspirin + Clop (12)

Ans: Clopidogrel + Rivaroxaban for 12 months

Explanation: According to ESC 2020 guidelines, **in patients with AF and CHA2DS2VASC score >1**, after a short period of aspirin, clopidogrel and NOAC up to 1 week from the acute event of NSTEMI, dual antithrombotic therapy is recommended using a NOAC at the recommended dose for stroke prevention and a single oral platelet agent preferably clopidogrel. Discontinuation of antiplatelet treatment is recommended after 12 months.

B 58

111. A patient with mechanical heart valve on warfarin therapy presented by lower GIT bleeding. Hemoglobin is 8 with an INR of 5.6. What should be the best management for him?

A. Vitamin K 10 mg IV

B. Fresh frozen plasma

C. Prothrombin complex concentrate

D. Activated factor VII

E. Whole blood

VIII XII

VIII XIII

Ans: Prothrombin complex concentrate

Explanation: In patients with warfarin associated life-threatening bleeding, rapid reversal of anticoagulation with four-factor prothrombin complex concentrate rather than fresh frozen plasma or recombinant factor VII is recommended. Repetitive 10 mg IV doses of vitamin K by slow injection are used in addition to this.

5-8

112. Which one of the following agents is used in the treatment of life-threatening bleeding associated with rivaroxaban therapy?

A. Vitamin K

B. Fresh frozen plasma

C. Protamine

D. Andexanet alpha

E. Idarucizumab

Ans: Andexanet alpha

Explanation: Andexanet alpha is the specific antidote of rivaroxaban, apixaban and edoxaban associated life-threatening bleeding and should be considered. Idarucizumab is the specific antidote of dabigatran. Protamine is the antidote of heparin. Vitamin K is used in warfarin associated bleeding.

113. Which of the following drug classes have demonstrated reductions in the risk for major adverse cardiovascular events (MACE) in patients with type 2 diabetes mellitus (T2DM) and established cardiovascular (CV) disease?

A. Biguanides

B. SGLT2 inhibitors

C. SGLT2 inhibitors + GLP 1 receptor agonist

D. DPP4 inhibitors + SGLT2 inhibitors + GLP-1 RAs

E. Sulfonylureas + SGLT2 inhibitors

Ans: SGLT2 inhibitors + GLP 1RAs

Explanation: Three human GLP-1–based drugs, albiglutide, liraglutide, and semaglutide, each showed a consistent, statistically-significant 3-point reduction in MACE compared with placebo in their respective outcome trials. The SGLT2 inhibitors empagliflozin, canagliflozin, and dapagliflozin each individually produced a MACE reduction in patients with established ASCVD. Unique to the SGLT2 inhibitor class is a reduction in hospitalization for heart failure and in renal disease progression. These two classes of anti diabetic agents are recommended in the treatment of diabetes with established CVD to prevent major adverse cardiovascular events.

114. **Which of the following situations can result in SVT with a wide QRS in the absence of a preexisting or rate-related bundle branch block?**

A. Orthodromic AVRT
B. Antidromic AVRT ✓
C. Typical AVNRT
D. Atypical AVNRT
E. Atrial flutter

anti

Ans: Antidromic AVRT

Explanation: In antidromic AVRT, antegrade conduction occurred through an accessory pathway, with retrograde conduction through the AV node (against the normal AV node conduction). An important exception to other forms of SVT is that a bystander accessory pathway, not involved in the tachycardia, may conduct to the ventricle and cause a pre-excited wide QRS.

115. **Which of the following lipid-lowering agents may worsen glycemic control in patients with borderline fasting hyperglycemia?**

A. Simvastatin
B. Atorvastatin
[✓ C. Niacin]
D. Gemfibrozil
E. Ezitimibe

Ans: Niacin

Explanation: Niacin worsens fasting hyperglycemia in some patients. Gemfibrozil and simvastatin reduced coronary event rates (including death) in patients with non-insulin-dependent DM in the Helsinki Heart Study and Simvastatin Scandinavian Survival Study, respectively.

116. You are asked to see a 31-year-old woman who presents in her 32nd week of pregnancy with sudden onset severe chest discomfort. The patient presented to the ED for evaluation. She is markedly diaphoretic. When you see her, she has received 2 SL NTG and has persistent chest pain. She denies cocaine usage. An ECG is obtained and shows 2 mm ST segment elevation in the anterior precordial leads V2, V3, V4. You would recommend which of the following?

A. Perform an emergency coronary angiography and PCI if indicated by the coronary anatomy

B. Administer thrombolytic therapy with tPA in order to minimize radiation exposure to the baby

C. Start a glycoprotein IIB/IIIA inhibitor and wait 1hr to assess the clinical response.

D. Perform a CT scan of the chest to rule out aortic dissection or pulmonary embolism

E. Start aspirin therapy, administer IV NTG, and admit to the CCU for observation

Ans: Perform an emergency coronary angiography and PCI if indicated by the coronary anatomy

Explanation: CAD including ACS may be infrequently encountered during pregnancy. This patient has features of an acute anterior wall MI by clinical and ECG parameters. Emergency coronary angiography is indicated. If coronary intervention is required, additional therapy with other medications could be considered. The diagnosis of acute coronary disease should be confirmed before therapy is instituted. The differential diagnosis should include spontaneous coronary artery dissection, aortic dissection with ostial coronary involvement (bilateral upper extremity pulses and BP should be evaluated as well as a careful cardiac auscultation for the diastolic murmur of AR) and pulmonary embolism.

Note ascending aortic dissection usually involves the RCA rather than the left main coronary artery or its branches.

117. Which of the following clinical variables is associated with increased 30-day mortality risk in a STEMI patient?

A. Age 50 years

B. Male sex

C. History of cigarette smoking

8

D. Initial HR of 130 bpm

E. Initial BP of 150/100 mmHg

Ans: Initial HR of 130 bpm

Explanation: Tachycardia on presentation of STEMI is associated with increased 30-day mortality. The other variables are not associated with an increased short-term risk.

118. A 60 year old man with CCF comes for annual check up. He has received flu vaccine. What other vaccine is also recommended for him in relation to heart failure?

A. Chicken pox

B. Hepatitis B

C. Meningococcal

D. Pneumococcal

E. Measles

Ans: Pneumococcal vaccination is recommended in heart failure every 5 years.

119. Which of the following would be most likely in a patient with chronic severe MR?

A. Normal LV cavity size

B. Dyspnea

C. EF > 65%

MR

D. RV heave

E. Third heart sound

Ans: Third heart sound

Explanation: Patients with severe chronic MR should have an enlarged LV. Many of these patients are asymptomatic subjectively and must be assessed by exercise test to determine their level of exercise capacity. The EF, even in asymptomatic patients, can be normal or abnormal. RV dysfunction or pressure overload is variable. Third heart sound indicates chronically elevated end-diastolic volume due to an enlarged ventricle. It coincides with the Y descent of the atrial pressure pulse as well as the end of the rapid filling phase. It is not specific to MR. S3 is an early diastolic event, not end diastolic. It is due to rapid filling of the LV due to enhanced suction in young healthy patients, rapid inflow in restrictive physiology, or rapid inflow due to large regurgitant volume. In the latter, the patient may have a rumble as well.

120. Which of the following patients with severe chronic MR is not a surgical candidate for mitral valve replacement?

A. NYHA functional class III, EF 40%

B. NYHA functional class I, EF 70%, LV end systolic diameter 35 mm

C. NYHA functional class II, EF 50%

D. NYHA functional class II, EF 70%, LV end systolic diameter 42 mm

E. NYHA functional class III, EF 30%

Ans: NYHA functional class I, EF 70%, LV end systolic diameter 35 mm

Explanation:

- According to the ACC/AHA guidelines, patients with symptomatic (NYHA classes II–IV) chronic severe MR should be considered for surgery in absence of severe LV dysfunction (EF –30% or end-systolic dimension 55 mm).
- Asymptomatic patients should be considered for surgery if the EF is 60%, the end-systolic diameter is 45 mm, AF has recently started, or there is pulmonary HTN.
- In those who are asymptomatic, surgery should be performed for severe chronic MR with an LV EF of 30% to 60% and/or end-systolic dimension 40 mm.
- Mitral valve surgery is reasonable for asymptomatic patients with chronic severe primary MR and preserved left ventricular function (LV ejection fraction [LVEF] >60% and LV end-systolic dimension [LVESD] < 40 mm) with a progressive increase in LV size or decrease in EF on serial imaging studies.
- Asymptomatic patients with severe chronic MR and preserved LV function who have new onset AF or pulmonary HTN defined as a PA systolic pressure 50 mmHg at rest or 60 mmHg with exercise should also be considered for surgical intervention.
- Lastly, if severe chronic MR is due to a primary abnormality in the mitral valve apparatus and the patient has NYHA classes III–IV symptoms, with severe LV dysfunction (LV EF 30% or end-systolic dimension 55 mm), then surgery could be considered if a mitral valve repair is highly likely.

4-6cm²
MS
1cm²
1.5 cm²

121. A 63-year-old man presents with a heart murmur. He is completely asymptomatic and active. Exam shows carotid delay, single S2, and a 3/6 mid-peaking ESM. TTE shows normal LV size and function, calcified aortic valve, and a mean aortic valve gradient of 52 mmHg with an aortic valve area of 0.8 cm2. Which of the following is the next best step?

A. Heart catheterization with coronary angiography ✓
B. Treadmill exercise testing ✗
C. AVR after coronary angiogram
D. Observation with IE prophylaxis
E. Percutaneous balloon aortic valvuloplasty

CTA
P
Duplex
CTA, MRA
DVT
Duplex scan
MRV

Ans: Treadmill exercise testing

Explanation: The consensus of the Guidelines Committee is that patients should not have an operation for asymptomatic AS in the absence of critical stenosis, drop in BP during treadmill exercise testing, or LV systolic dysfunction. The committee also recommend performing a treadmill exercise testing to look for ventricular arrhythmias, a drop in BP, or to get an objective measurement of exercise tolerance. Close follow-up and an echocardiogram every year is recommended to identify symptoms and a change in LV function. A hemodynamic catheterization is necessary only to settle a discrepancy of symptoms, echocardiographic findings, or lack of physical findings supporting the diagnosis, or to provide a diagnosis when one needs to clarify different findings. In this case, the exam and findings on echocardiogram are consistent with AS. The current guidelines do not support AVR in those who have asymptomatic AS with preserved LF function. The patient needs appropriate follow-up for changes in clinical status and LV function; therefore, observation alone is not appropriate. Percutaneous balloon valvotomy for AS has a class III indication as an alternative to valve replacement.

122. A 32-year-old woman has known MS. She is able to exercise daily for 45 min without symptoms. Six months ago she had an echocardiography that showed a mean gradient of 5 mmHg, MVA of 1.6 cm2, and a PAP of 30 mmHg. She wants to get pregnant. What would you recommend?

MS
<1cm²
1.5 cm²
30mmHg

A. Repeat echocardiography
B. Do transesophageal ECHO ✓
C. Percutaneous balloon valvotomy
D. Mitral valve replacement

MS

E. Proceed with pregnancy with beta blockade as necessary

MS 2nel.

Ans: Proceed with pregnancy with beta blockade as necessary

Explanation: This patient has only moderate MS and is asymptomatic. Therefore, there is no indication for a balloon valvuloplasty or MVR. Most of these patients tolerate pregnancy well. She will need frequent rest during the day, lying in the left lateral decubitus position to avoid compression of the IVC. Beta blockade could be instituted to slow the HR and optimize diastolic filling time if symptomatic tachycardia occurs. Otherwise, she should do well throughout the pregnancy without pulmonary HTN or severe MS. A TEE would not provide any additional necessary information in this case.

123. A 43-year-old woman had acute onset of shortness of breath and lightheadedness. She had a history of rheumatic fever and subsequent MVR. On physical examination, she was pale and tachypneic. HR was 95 bpm and regular, with a low-volume pulse. BP was 95/44 mmHg. There were bilateral pulmonary rales with associated lower extremity edema and elevated JVP. A new murmur was present. The next step in your evaluation should be:

[✓ A. Cardiac catheterization]

[✓ B. Transthoracic echocardiography]

C. Transesophageal echocardiography

D. Cardiac CT

E. Chest x-ray

new claudication
duplex

3.

DVT
CT Veno
MR Veno

Ans: Transthoracic echocardiography

Explanation: Signs and symptoms of heart failure in a patient with prosthetic heart valve suggest the diagnosis of thrmbosis of the valve. TTE should be performed initially and, if adequate views of her prosthetic valve are not obtainable, TEE may be helpful. If there is thrmbosis of the valve, thrombolysis should be done.

3mm

124. A 50-year-old man is referred to you for an outpatient evaluation of atypical chest symptoms. He has HTN and hyperlipidemia. He walks regularly with his wife and has no orthopedic problems. His resting ECG shows greater than 1 mm nonspecific ST depression in multiple leads. Which of the following tests should be performed?

A. Exercise ECG

B. Exercise thallium scan ✓

C. Dobutamine thallium scan

D. Dipyridamole thallium scan

E. Dobutamine stress ECHO

Spec
60-9
30-70

Ans: Exercise thallium scan

Explanation: For the diagnosis of obstructive CAD, stress perfusion imaging or stress echocardiography is preferred when the ECG cannot be interpreted, or when the patient cannot exercise. This patient's resting ECG shows greater than 1 mm ST depression. The stress ECG will be nondiagnostic in such cases, and greater than 1 mm resting ST depression is an ACC/AHA Guidelines class III indication for performing an exercise test without imaging for the diagnosis of obstructive CAD. Exercise capacity is a powerful predictor of both all-cause and cardiac mortality. It provides prognostic information that is incremental to imaging findings. There are several baseline ECG changes that can obscure the test results of exercise ECG and make it difficult to interpret for ischemia. Such baseline changes include ST-segment changes that are greater than or equal to 1 mm, left bundle branch block, ventricular paced rhythm, left ventricular or right ventricular hypertrophy, ventricular pre-excitation (i.e., WPW syndrome), T wave inversions due to strain pattern or previous injury, conduction abnormalities and medication-induced ST-T wave changes. If any of these ECG abnormalities are noted, the test should be performed with the addition of an imaging modality. Exercise Thallium-201 myocardial imaging has proved a sensitive and specific test for the detection of significant coronary artery disease and allows differentiation between myocardial ischemia and infarction. The diagnostic accuracy of Thallium-201 myocardial imaging compares favorably with exercise electrocardiography. The technique is particularly useful where the exercise electrocardiogram is non-diagnostic or equivocal.

125. A patient presents in ER with palpitations. ECG showed broad complex tachycardia. Which of the following features suggest that broad complex tachycardia is due to VT instead of SVT with aberrancy?

A. Right axis deviation

B. RBBB like morphology

C. LBBB like morphology

D. AV dissociation ✓

E. QRS duration of 12ms

Ans: AV dissociation

Explanation: There are three main diagnostic possibilities of broad complex tachycardia:

- Ventricular tachycardia (VT)
- Supraventricular tachycardia (SVT) with aberrant conduction due to bundle branch block
- SVT with aberrant conduction due to the Wolff-Parkinson-White syndrome

ECG features increasing the likelihood of VT:

- Absence of typical RBBB or LBBB morphology
- Extreme axis deviation ("northwest axis") — QRS is positive in aVR and negative in I + aVF.
- Very broad complexes (>160ms)
- AV dissociation (P and QRS complexes at different rates)
- Capture beats — occur when the sinoatrial node transiently 'captures' the ventricles, in the midst of AV dissociation, to produce a QRS complex of normal duration.
- Fusion beats — occur when a sinus and ventricular beat coincides to produce a hybrid complex.
- Positive or negative concordance throughout the precordial (chest) leads, i.e. leads V1-6 show entirely positive or entirely negative (QS) complexes, with no RS complexes seen.
- Brugada sign – The distance from the onset of the QRS complex to the nadir of the S-wave is > 100ms
- Josephson sign – Notching near the nadir of the S-wave
- RSR' complexes with a taller left rabbit ear. This is the most specific finding in favor of VT. Note: This is in contrast to RBBB, where the right rabbit ear is taller.

The likelihood of SVT with aberrancy is increased if:

- Previous ECGs show a bundle branch block pattern with identical morphology to the broad complex tachycardia.
- Previous ECGs show evidence of WPW (short PR < 120ms, broad QRS, delta wave).
- The patient has a history of paroxysmal tachycardias that have been successfully terminated with adenosine or vagal manoeuvres.

126. A 26 year old asthmatic female on steroids inhaler presented in emergency with palpitations. ECG showed narrow complex tachycardia. Patient has normal BP with no chest pain or shortness of breath. Vagal maneuvers are unable to terminate the tachycardia. What should be your next best management step in this patient?

A. IV adenosine bolus
B. IV metoprolol
[✓ C. IV verapamil]
D. DC cardioversion
E. IV amiodarone

MR

Ans: IV verapamil

Explanation: Management of SVT:

- Best initial management =>> Vagal maneuvers
- Best initial drug treatment =>> IV adenosine
- If adenosine unavailable =>> IV metoprolol
- If patient is asthmatic then adenosine and metoprolol would be contraindicated them => IV verapamil
- Unstable SVT (Low BP, heart failure, chest pain) => DC cardioversion
- Definite treatment for recurrent attacks=> RFA of accessory pathway

(4) 4.5

127. A 45 year old hypertensive male presented in ER with chest pain for 4 hours. ECG showed Q waves in anterior leads. Which of the following is the best management for him in a tertiary care hospital?

A. Aspirin + ticagrelor
B. IV nitrates
C. IV heparin
D. IV alteplase
E. Urgent PCI ✓

Ans: Urgent PCI

Explanation: The presence of Q waves in anterior leads suggests the diagnosis of transmural MI, and the presence of Q waves in ECG is diagnostic of STEMI. Q waves can appear early in the course. The best management of STEMI is always PCI if available.

- STEMI patients should undergo a primary PCI strategy unless the anticipated absolute time from STEMI diagnosis to PCI-mediated reperfusion is >120 minutes, in this case, fibrinolysis should be initiated immediately (i.e., within 10 minutes of STEMI diagnosis).
- Patients with ST-elevation on post-resuscitation ECG should undergo a primary PCI strategy. In cases without ST-segment elevation on post-resuscitation ECG, but with a high suspicion of ongoing myocardial ischemia, urgent angiography should be done within 2 hours after a quick evaluation to exclude noncoronary causes. In all cases, the decision to perform urgent coronary angiography should take into account factors associated with poor neurological outcome.

128. Which of the following is true regarding stunned myocardium?

A. Reduced perfusion, reduced metabolism, reduced contraction

B. Reduced perfusion, reduced metabolism, good contraction

C. Reduced perfusion, good metabolism, reduced contraction

[✓ D. Good perfusion, good metabolism, poor contraction]

E. Good perfusion, poor metabolism, poor contraction

Ans: Good perfusion, good metabolism, poor contraction

Explanation: Prolonged severe reduction of coronary blood flow can seize myocardial contractility in an irreversible fashion as a result of myocardial necrosis. However, myocardium can be salvaged with early coronary reperfusion. Nonetheless, the viable reperfused myocardium might not return to contracting properly immediately following reperfusion. The subsequent prolonged but transient postischemic dysfunction after reperfusion is known as the stunned myocardium. In stunned myocardium, there is persistent contractile dysfunction following reperfusion with good metabolism. PET scan is used to check the metabolic activity in stunned myocardium. Stunned myocardium shows uptake of fluorodeoxyglucose whereas scar tissues show absent uptake of FDG. Stunned myocardium is different from hibernating myocardium in that, in hibernating myocardium there is continuous poor perfusion with poor contractile dysfunction.

129. A 72 years old male on multiple medications presented with recurrent episodes of dizziness for 3 months. Which of the following is the most common treatable cause of dizziness in this patient?

A. [✓ Postprandial hypotension]

B. [✓ Diuretic use]

C. Diabetic autonomic neuropathy

D. Aortic stenosis

E. Shy Dragger syndrome

Ans: Diuretic use

Explanation: In old age, the most common cause of dizziness is anti-hypertensive medications specifically diuretics. If patient presents with dizziness, stop diuretics which is the most common treatable cause of dizziness in elderly people.

130. A 45 year old male presented with recurrent episodes of palpitations. 48-Holter monitoring was done. Which of the following is least likely to be present on Holter monitoring?

A. SVT

B. Atrial fibrillation

C. Atrial flutter

D. [✓ Wencheback phenomenon]

E. Non-sustained VT

CT-MRV

Dup

Ans: Wencheback phenomenon

Explanation: All of the above can presents with recurrent episodes of palpitations and can be present on Holter monitoring except Wencheback phenomenon which is typically a benign condition and rarely causes any symptom.

131. A 45 year old male with history of hypertension presented with headache. Examination showed BP of 210/120 mmHg with no focal deficit. Fundoscopy shows flame shaped hemorrhage and papilledema. Which of the following is the best next step in management?

A. Oral captopril

B. Sublingual nifedipine

C. IV nitroprusside ✓

D. Aspirin 300 mg stat

E. Oral amlodipine

φ α

M
φMC.

Ans: IV nitroprusside

Explanation: This patient presents with a hypertensive emergency with malignant or accelerated hypertension. Accelerated hypertension is defined as a recent significant increase over baseline BP that is associated with target organ damage. This is usually seen as vascular damage on funduscopic examination, such as flame-shaped hemorrhages or soft exudates, but without papilledema. In order to diagnose malignant hypertension, papilledema must be present. These patients need urgent reduction of blood pressure. The most commonly used intravenous drug is nitroprusside. An alternative for patients with renal insufficiency is intravenous fenoldopam. Labetalol is another common alternative, providing easy transition from intravenous to oral dosing. However, a trial demonstrated that intravenous calcium blockers (e.g., nicardipine) could be useful in quickly and safely reducing BP to target levels and seemed more effective than intravenous labetalol. For patients with compelling indications such as aortic dissection, severe preeclampsia or eclampsia, or pheochromocytoma, systolic BP should be reduced to less than 140 mm Hg during the first hour and to less than 120 mm Hg in aortic dissection. In others with hypertensive emergencies, systolic BP should be reduced by no more than 25% within the first hour then, if stable, to 160/100 mm Hg within the next 2 to 6 hours, and then cautiously to normal during the following 24-48 hours. Short-acting nifedipine should not be considered for the initial treatment of this condition, because of the risk of rapid, unpredictable hypotension and the possibility of precipitating ischemic events. Oral captopril is used in malignant hypertension associated with scleroderma.

IV

132. A 55 year old smoker male has an abdominal ultrasound for right upper quadrant pain has an incidental finding of an aortic aneurysm of 4.3 cm. What should be the next best step of management for him?

A. CT angiography

B. Endovascular repair

C. Doppler USG

D. Ultrasound 6 monthly ✓

E. CT abdomen

3.
3-4
4-4.5
>4.5 cm

Ans: Ultrasound 6 monthly

Explanation: This patient has asymptomatic abdominal aortic aneurysm diagnosed on ultrasound as an incidental finding. Ultrasound is the best imaging modality for the diagnosis and surveillance of AAA. Normal aorta is 1-2.4 cm. When the diameter is > 3 cm, it is called aneurysm. The cut-off size for referral for repair is > 4.5 cm. If the size is less than 4.5 cm, periodic surveillance by ultrasound is the best management. Follow up surveillance is done as follow:

- Aortic diameter < 3 cm => No further testing
- Aneurysm 3-4 cm => Annual ultrasound
- Aneurysm 4-4.5 cm => 6 monthly ultrasound
- Aneurysm > 4.5 cm => referral for aortic repair

Before aortic repair, CT scan is done for peri-operative assessment of accurate size and extension to the local structures.

133. A 54 year old male has a chest x-ray for cough and shortness of breath. Lateral view of chest x-ray showed pericardial calcifications. Which of the following is the most common cause of this finding?

A. Viral pericarditis
B. Radiation pericarditis
[✓ C. Tuberculous pericarditis]
D. Lupus pericarditis
E. Post cardiac surgery pericarditis

Ans: Tuberculous pericarditis

Explanation: Normally the pericardium lacks any calcium deposits and calcification may be a sign of underlying inflammation or a more sinister etiology. Pericardial calcification alone is generally asymptomatic; however, signs and symptoms can develop due to underlying disease processes such as constrictive pericarditis (CP). However, a significant point to keep in mind is that pericardial calcification may not be present in up to 20% of cases of CP and it may be present in the absence of constrictive physiology. Tuberculosis has been a major cause of CP in the developing countries and accounted for almost half of the cases. In developed countries, major cardiac surgery and 'idiopathic' cases as being the most common etiologies followed by radiation heart disease. Idiopathic cases are mostly due to previous viral pericarditis. Other etiologies are; trauma, malignancy, rheumatologic and connective tissue diseases.

134. A 42 years old male presented with low grade fever, weight loss and dyspnea for 6 months. Examination of precordium showed auscultatory findings of MS. Echocardiography showed a mass in left atrium. What is the probable diagnosis?

A. Infective endocarditis
B. Libman sacks endocarditis
C. Rheumatic fever
D. Atrial myxoma
E. Carcinoid heart disease

Ans: Atrial myxoma

Explanation: History of low grade fever, examination findings of mitral stenosis and a left atrial mass suggest the diagnosis of atrial myxoma. The characteristic features of atrial myxoma are:

- Atrial myxomas are the most common primary heart tumors.
- Approximately 90% are solitary and pedunculated, and 75-85% occur in the left atrial cavity. Up to 25% of cases are found in the right atrium.
- Symptoms from a cardiac myxoma are produced by mechanical interference with cardiac function or embolization.
- Symptoms of atrial myxomas range from nonspecific and constitutional to sudden cardiac death.
- Dyspnea on exertion (75%) that may progress to orthopnea, paroxysmal nocturnal dyspnea, and pulmonary edema is observed.
- Severe dizziness/syncope is experienced by approximately 20% of patients. The most frequent cause in patients with left atrial myxomas is obstruction of the mitral valve. Symptoms may change as the patient changes positions.
- Systemic or pulmonary embolization may occur from left- or right-sided tumors.
- Embolization to the central nervous system may result in transient ischemic attack, stroke, or seizure.
- On the right side, embolization results in pulmonary embolism and infarction.

- Systemic embolization that causes occlusion of any artery, including coronary, aortic, renal, visceral, or peripheral, may result in infarction or ischemia of the corresponding organ.
- Constitutional symptoms that include fever, weight loss, arthralgias, and Raynaud phenomenon are observed in 50% of patients. These symptoms may be related to overproduction of interleukin-6.
- Jugular venous pressure may be elevated, and a prominent A wave may be present.
- A loud S1 is caused by a delay in mitral valve closure due to the prolapse of the tumor into the mitral valve orifice (mimicking mitral stenosis).
- In many cases, an early diastolic sound, called a tumor plop, is heard. This sound is produced by the impact of the tumor against the endocardial wall or when its excursion is halted.
- General examination may reveal fever, cyanosis, digital clubbing, rash, or petechiae.
- Elevated erythrocyte sedimentation rate (ESR) and elevated C-reactive protein and serum gamma globulin levels are present.
- Anemia may be normochromic or hypochromic. Hemolytic anemia may occur because of the mechanical destruction of erythrocytes by the tumor.
- Transthoracic echocardiography is the imaging modality of choice for the diagnosis of atrial myxoma. An atrial myxoma must be differentiated from a left atrial thrombus. The thrombus is usually situated in the posterior portion of the atrium and has a layered appearance. Presence of a stalk and mobility favors atrial myxoma.
- Conventional treatment of atrial myxoma is surgical removal by median sternotomy.

135. During the cardiac life support, which of the following is the most important step in decreasing the risk of neurological damage?

A. Continuous chest compressions ✓

B. Putting hard board

C. Early endotracheal intubation

D. Giving mouth to mouth ventilation

E. Giving epinephrine

DVP

QTV

Ans: Continuous chest compressions

Explanation: Deep and continuous chest compressions can crack ribs, but they reduce brain damage during cardiac arrest. Chest compressions improve blood flow to the brain, improving survival and brain function. Hardboard is used during hospital CPRs and it's main function is also to improve the quality of chest compressions but continuous chest compressions is the most important step in the resuscitation.

136. A known case of ischemic hear disease on many medications presented with palpitations for 2 hours. He has taken erythromycin for an upper respiratory tract infection. ECG showed runs of polymorphic VT in multiple paroxysms with prolonged QT interval. How will you manage this case?

A. Sotalol
B. Amiodarone
C. MgSO4 ✓
D. Procainamide
E. Cardioversion

Mg SO4 -

Ans: MgSO4

Explanation: Long QT interval associated with multiple paroxysms of polymorphic VT suggest the diagnosis of torsade de pointes. Patient has history of taking erythromycin which is also a cause of acquired prolonged QT interval which can results in TDP. Magnesium is the drug of choice for suppressing early afterdepolarizations and terminating the arrhythmia. Magnesium can be given at 1-2 g IV initially in 30-60 seconds, which then can be repeated in 5-15 minutes. Alternatively, a continuous infusion can be started at a rate of 3-10 mg/min. Magnesium is effective even in patients with normal magnesium levels. In an otherwise stable patient, direct current (DC) cardioversion is kept as a last resort, because torsade is paroxysmal in nature and is characterized by its frequent recurrences following cardioversion. Although torsade frequently is self-terminating, it may degenerate into ventricular fibrillation, which requires DC defibrillation. Sotalol, amiodarone and procainamide causes QT prolongation and should be avoided.

QT.
syncop
ICD